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Participation and Education in Community Water Supply and Sanitation Programmes

A Literature Review

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A Literature Review

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When implementing environmental sanitation programmes villages should be made aware of the need for quality control of their own supply. (photo: WHO)

PREFACE

In these days of transition of the whole concept of development, there is hardly an idea which has sparked off more discussions and which has been idealized more than that which is usually referred to as community participation.

At the same time, few concepts have remained so abstract. In spite of all our general "knowledge" about community participation, it is still largely unknown how to effect it in practice. This has led to a situation where the expression "community participation" is used very frequently to indicate a wide range of ideas and actions. In fact, it has become so fashionable that many people are beginning to feel a certain aversion to it.

This obviously has the danger that the good is rejected with the bad and that the very real importance of dialogue and community involvement is lost sight of. Hence, what is needed is a realistic assessment of the potential of community participation under different conditions, which should lead to the translation of the concept into practical guidelines and clear directives for action. Such an evaluation and action research should be carried out in and by developing countries themselves.

This review has been compiled in order to support national development agencies in the design, testing and implementation of community participation and education strategies in water supply and sanitation programmes. It aims to take stock of data and information on community participation and education which could be obtained from the literature and which seemed relevant for a wider readership. Since much of the literature on the subject and in particular the more detailed case studies are difficult to obtain, an extensive mailing survey preceded the actual study.

Together with this literature review a selected and annotated bibliography will appear. This bibliography contains detailed abstracts of the 145 most relevant works on which the review is based and is published as no. 13 in the IRC Bulletin Series. It should be stressed that in this stage the study is presumed neither to be exhaustive, nor final.

It is recognized that additional information and experience is available and should be included in future versions.

The reader is therefore invited to provide the IRC with such information, which will be used in any subsequent revision of the work.

In the meantime, it is hoped that the two documents may already serve the purpose they are meant for: namely as a tool for the design, testing and evaluation of community participation components of water supply and sanitation programmes.

ir. P. Kerkhoven,
Programme Officer

INTRODUCTION

Three brothers, working on the land, refreshed themselves through a regular pull at a drinking calabash. When the eldest brother came to drink, the calabash contained beer. When the middle one came, he got milk, but when it was the turn of the youngest to drink, he only found water.

Dissatisfied, the youngest brother consulted a ghost, who told him to climb a tree. From there he could observe how an old woman who brewed the local beer filled the calabash just before his eldest brother came to drink. When he had left, a nomad woman passed by, emptied the calabash and filled it with goat milk. His second brother came, drank and left. His place was taken by the village water vendor, who poured out the last bit of milk and filled the calabash with clear spring water.

When the vendor had left, the ghost explained the secret meaning of the three drinks. The oldest brother, who got the beer, would become village chief; the second one, who drank the milk would be rich, but the youngest, who got the fresh water, would grow strong and healthy. Satisfied, the youngest brother returned to his work.

This West African folk tale illustrates the importance of safe and easily available drinking water, a need which for the greater part of the inhabitants of developing countries has yet to be fulfilled.

The most recent survey of community water supply and excreta disposal facilities in developing countries, carried out by the World Health Organization in 1975, found that some 1.230 million people or 62 per cent of the Third World's population, excluding China, were without an adequate water supply and that

1.350 million were without sanitation (WHO, 1976).

The need is most urgent in rural areas, where approximately 70 per cent of the population live. Of these people only 22 per cent had access to good water in 1975 as compared with 78 per cent of the city population. For sanitation these figures were 15 and 75 per cent respectively. Within the cities the need in the fringe and squatter areas is most urgent. These figures indicate that a higher priority for the sector is urgently required and that the emphasis first of all should be on implementation programmes in the rural and urban fringe areas.

A problem which demands as much attention as the increased construction of adequate rural water supply and sanitation facilities is their continued functioning and use. Cairncross et al. (1978) estimated the current percentage of non-functioning water systems at 30, while Saunders and Warford (1976) found that in some developing countries water supplies actually were failing at a more rapid rate than they were being constructed. In South-East Asia, it is estimated that there are at present nearly 450.000 handpump tubewells, but reports on their operation give breakdown percentages of 20 to 70 (Gunaratne, 1978).

The relationship between water and disease is widely acknowledged (Déom, 1976; Saunders and Warford, 1976; White et al., 1972; White and Seviour, 1974). Yet water supply and sanitation programmes do not always have the health impact expected from them (Feachem et al., 1976; Levine et al., 1976; Pisharoti, 1978). Neither do the potential social and economic benefits always materialize.

An important contribution to the solution of these problems lies in the inclusion of a strong element of community partici-

pation and education in development projects. Although this is a rather general statement which can be interpreted in many ways, the literature provides evidence that some form of participation and education in the various stages of community water supply and sanitation programmes is a condition for success.

If community participation and education are to become routine components of community water supply and sanitation programmes, clear policies and planning guidelines are necessary. A review of the existing experience in this field, resulting in cross-cultural generalizations and planning options, can be a great help for policy makers and programme planners.

Such experience can be laid down in a series of case studies (World Bank, 1978) or be registered by a cross-cultural survey (Imboden, 1977). Alternatively, a comparison can be made of the plans for and implementation of those community water supply and sanitation programmes, which include an education and participation component. Such programmes exist in many Latin American countries.

The object of the present work is to gather and make accessible the existing experiences through a general survey of the literature. A problem here is the fugitive nature of the material. Much of the literature has not been officially published or is difficult to acquire. A list of some relevant references, which could not be obtained in time for review appears in Annex II. Another problem is the language. There is a wealth of experience in community participation in Latin America, but the extensive literature in Spanish and Portuguese is of little use to the Francophone and Anglophone countries of Africa and Asia.

This volume discusses the material according to subject. References within the text are listed in full in Annex I. Some general conclusions which can be drawn from the literature reviewed appear in the paragraphs below.

Community participation in water supply and sanitation projects is gaining a wide acceptance. It will have much more effect if the water agency explicitly includes this element into its planning. An educational programme to prepare the community for this participation will also have a positive influence. An important part of this educational programme is the sanitation education necessary for a maximum health impact. The simultaneous initiation of further environmental sanitation activities, in particular for better waste disposal, is also highly emphasized. The existence of other local priorities or development plans may demand a further integration of programmes. The cooperation of all relevant agencies and joint planning and execution of projects are essential conditions for such an integrated approach.

A dialogue between community and agencies during the planning stage is especially important. A community is more likely to cooperate in the implementation and operation and maintenance of new systems if it has had a say in the preparation of the plans. This joint planning is frequently based on an investigation of the local situation. Local cultural and socio-economic conditions are always of decisive importance. A tendency is noted to moderate the use of large-scale sociological surveys in favour of other research methods. This approach offers a better chance for participatory research.

Recently there has been a growing interest in the evaluation of ongoing and completed programmes. Sharing the results of such

evaluation with the whole community can form part of the educational process, contributing to a greater community commitment to correct maintenance and use of the facilities. Participation of the community in the evaluation process itself is still rare, however. Suitable methodologies similar to those for participatory research will have to be developed, to be included in the educational programme.

There is no unanimity on the degree of flexibility in community level administration. In some publications, a standard administrative system is advocated, with a fixed degree of authority delegated to the local level. According to others, various types of administrative systems should be offered to the community as a basis for ad hoc arrangements. The choice in this matter is determined by the national policy and by organizational considerations, which will vary from place to place. No general recommendations on the most advisable degree of decentralization are possible. The administrative system or systems, the contact with the agency after construction and the procedures for future adaptations should be placed within a formal, legal framework. Continuation of sanitation education after construction of the community facilities is indispensable. In general this demands specific organizational arrangements in the community, rather than the mere indication of a need for some kind of health education.

The role of self-help activities in the construction phase is an ambiguous one, which calls for further analysis. Some publications mention self-help as a cost-saving element, which increases feelings of local pride and commitment, offers training possibilities and stimulates proper use and maintenance. Other publications suggest that the use of contractors would have

been more efficient, by avoiding problems of delays, raised costs, overburdening of the community, poor construction leading to frequent breakdowns and a dislike of further contributions towards operation and maintenance.

On the whole, the scales turn in favour of some kind of active village contribution in the construction phase, especially when a number of pitfalls, as recorded in the literature, can be avoided through proper planning and education. Further investigations into the real costs and gains of self-help construction remains necessary.

The present emphasis on rural programmes should not imply that the importance of continued efforts to improve sanitary conditions in the urban squatter settlements is forgotten. A complication here is that the provision of facilities in these areas is sometimes interpreted as an encouragement to the settlers, and as a confirmation of their rights to stay, which may be contrary to official policy. The non-participatory approach of urban supply agencies and the fact that the settlements have little community identity, are obstacles to successful cooperation and participation. The development of participation and education strategies to use and stimulate the available skills and expertise, in these areas, therefore, poses an even greater challenge to the agencies than it does in rural areas.

From the above summary it is clear that a considerable amount of research into various aspects of the subject community participation remains to be carried out. It is hoped that the present work may be a useful contribution in this respect, and that it may give rise to increased activity in the field of community participation studies.

I PLANNING FOR PARTICIPATION AND EDUCATION IN COMMUNITY WATER SUPPLY AND SANITATION PROGRAMMES

From the available literature three questions emerge essential to the planning of community participation and education in rural water supply and sanitation programmes. These questions are: whether there is a special rural policy regarding environmental sanitation, preferably in a package approach; whether there is a clear and officially stated view on the desirability and possibility of community involvement in the various phases of the programmes; and whether a sanitation education component is included. This component aims to effect an optimal adoption, use and maintenance of the technological facilities, as well as the changes in general sanitary behaviour necessary for a maximum health impact.

1. A COMMUNITY WATER SUPPLY AND SANITATION POLICY

From the WHO survey on water and excreta disposal (Pineo, and Subrahmanyam, 1975) it is clear that conditions in rural areas are much worse than those in urban areas, with the majority of the population living in these rural areas. A third category, the urban fringe areas, resembles the rural areas in its conditions; but is even worse off, because its population usually has no choice between alternative supply sources; has worse housing conditions and a greater health risk, and lacks the open field for excreta and waste disposal.

A recognition of the necessity of a special programme for these two problem areas is a first step. A special sector on

water and sanitation for rural and urban fringe areas can be included in the national or regional plans. An alternative is the design of integrated rural and urban fringe development plans, in which environmental sanitation is but one of the components for more general development (World Bank, 1976). A national survey of environmental sanitation conditions in the rural and urban fringe areas may provide the basic data for the development of such plans.¹⁾

A second distinction to be made is between growth-point strategies and worst-first strategies, in the allocation of the scarce funds for environmental sanitation programmes. Under the former, communities and areas with the highest economic growth potential are favoured; under the latter, areas and communities with the greatest need for humanitarian and health assistance, e.g. in semi-arid regions and areas with a high incidence of water-related diseases. The selection of areas and communities with a high growth potential may lead to a growing gap between them and the poorer areas unless water is treated as an economic good. In that case, rates are to go up with the increased development of the area, and some of the surplus revenue is used to subsidize programmes in poorer areas. The World Bank (1976) therefore suggested the development of payment levels according to village size or potential income, provided the villagers accepted the rates as equitable.

1) WHO and World Bank together have carried out sector studies to assist countries in their investigations of alternative development schemes, while WHO has carried out rapid assessment studies in connection with the International Drinking Water Supply and Sanitation Decade.

This does not, however, prevent the development of inequity within the area or the community. Padfield (1971) criticized the distinction between 'poor' and 'rich', or 'high' and 'low' potential, stating that in both there will be micro strata of inequality, e.g. poorest, poor, less poor and less less poor, with benefits used accordingly.

Under a piped supply system, a former water hauler and a farmer who used to employ him may both get 10 gallons per day. The farmer saves the cost of wages, while the hauler exchanges his wages for unemployment. The chances are, moreover, that the farmer will get much more water at a relatively lower cost. This he can put to a better use, so that the old differentials in the distribution of benefits still prevail, or even widen.

Other examples of increased inequity within an area, due to water supply and sanitation improvements, are provided by Chege et al. (1976), and Briscoe (1977). The former found an increase in farm water supplies from 21 per cent in 1970 to 50 per cent in 1973 for the most progressive farmers in Tetu district of Kenya; while for the least progressive of the farmers, these figures were 4 and 10 per cent respectively. The lagging farmer may get discouraged, sell to the prosperous one and join the ranks of the unemployed in the big cities (Jakobsen et al., 1971). Briscoe (1977) points out that the owners of gobar gasplants in the Indian subcontinent belong to the highest socio-economic strata, and that the situation of the rural poor is further deteriorated by the construction of these plants. The excreta from the cattle of the rich, a raw material for the plant, used to be a free and basic fuel for

the poor, but has now become an organic resource with an economic value for its legal owners.²⁾

White (1974) therefore advocated a distinction between water as an economic good and water as a human right, a means of income redistribution even. Recognition of environmental sanitation as a human right (for some communities

flexible arrangements for rural areas, and facilitate community participation in planning, construction, operation and maintenance. In Guatemala, for example, the proportion of community contributions in construction and operation costs ranges from nothing to the entire costs. (White, 1974)

Padfield (1971) and Jakobsen et al. (1971) go one step further, and stress the development of typologies for decision making by community, economic categories (e.g. haulers for self, haulers for self and others, and employers of haulers), or socio-economic class. After this distinction has been made (by studying the sociological and micro-economic context rather than the growth potential of a whole area), repayment, welfare and combined schemes can be developed.

This type of approach, which stresses the function of water supply systems as a tool for the redistribution of income, demands a flexible national policy. Such a policy could vary from a repayment system with progressive rates for quality

²⁾ Although the construction of latrines and other private waste disposal facilities does not have such direct economic consequences, it is nevertheless remarkable that their adoption is often associated with a high socio-economic and educational level (Chen, 1969; PRAI, 1968; Roberts, 1961; Roy, 1968; Sandhu et al., 1977; Srivastara, 1969; Thorat, 1969; Tiglao, 1963) showing that the groups with a higher health risk due to their already poorer conditions are reached later by waste disposal programmes.

supplies in the inner cities to a combination of welfare and repayment schemes in rural areas, depending on the type of community and its subdivisions. In urban slum areas a welfare system could be developed with such quality and quantity standards as to reduce the health hazard to an acceptable minimum.

A revenue surplus can be realized by having the larger users in the inner city pay a progressive rate, because they use the supply for amenities such as bathing (instead of showering), toilet flushing, car washing and lawn watering, which can be viewed as taxable luxuries rather than life and health necessities. The surplus can then be used to help financing minimal supplies to peripheral and rural areas (White, 1974). Similar combinations of welfare and repayment schemes can be made within rural areas and communities.

SELECTION CRITERIA

The number of selection criteria will have to reflect the greater flexibility in policy for the allocation and recovery of funds for environmental sanitation programmes.

Three sets of criteria can be distinguished:

Need Criteria In this category fall appreciations of the existing water supply and sanitation (number of sources, distance, reliability, quantity and quality of the supply, general environmental sanitation conditions), socio-demographical data (type of settlement and clustering of villages, population density, population increase) and economic and health criteria (growth potential, existence of other development plans and programmes, socio-economic stratification and high health risks, e.g. because of a high incidence of water-related diseases, severe droughts, population concentrations and housing conditions as in urban slums and refugee camps).

Technical-Economical Feasibility Criteria Technical criteria and cost criteria (estimated costs of various schemes, number of people served per unit of expenditure, the need to import materials, village accessibility and means of communication) also play a part in determining priorities, although a decision on the use of flexible standards for quality and quantity may have an important influence on the relative weight of the various priority categories.

As these criteria fall outside of the scope of this paper they will not be discussed any further.

Social Feasibility Criteria Since the ultimate goal in the construction of environmental sanitation facilities is their continued maintenance and use, a 'felt need' for or interest in the development of environmental sanitation programmes is essential for their success.

In most Latin American and Caribbean countries, which have a long experience and good results in rural water supply services, "willingness of the community to participate" was the second highest of the criteria for arranging priorities in providing new supplies, as reported in the 1972 WHO survey. In tropical Africa however, this criterium was mentioned least of all (Pineo and Subrahmanyam, 1975).

This willingness must not only exist in the acceptance of responsibilities for financial and organizational contributions in the construction phase, but also in the operation and maintenance phase. Feachem et al. (1978) discussed the idea of a once-and-for-all payment: once a community has contributed towards a government initiated social service, they will consider the government responsible for keeping up this service, and therefore be less willing to contribute towards recurrent costs of management and maintenance.

Secondly, there must be a willingness to stimulate a change in public and private sanitary behaviour, so that the facilities will bring optimal health benefits.

An enumeration and description of activities to promote improved water supply and sanitation systems may be of assistance (Padfield, 1971), so that the communities will know what is expected of them by the government. It may go too far, however, to demand the payment of community contributions in advance, as a token of village interest.

In Lesotho, 227 villages had already paid subscriptions for an improved water supply, but the average annual construction over the last seven years was only 29 supplies (Feachem et al., 1978). Similar timelags were found for water supply and sanitation programmes in India (up to 16 months, PRAI, 1969), Kenya (up to 26 months, Scotney, 1976) and Peru (up to 4 years, Pineo, 1976c).

Although the existence of community interest and the willingness for continued involvement are very important, it may still be necessary to make this selection criterium the last chronologically, to avoid frustration of expectations at the local level. Another possibility is to prepare the community for the length of the selection process by explaining the necessity of the various time consuming procedures and drawing up a time-table.

Financial deposits need not be collected until the community has definitely spoken out in favour of a project. It is then invited to contribute as a further token of its interest (Feachem et al., 1978). A competitive element may also be introduced. In some Latin American countries villages vie with one another to make the maximum contribution and so receive a higher priority in the programme (World Bank, 1976). Here, guarantees for a proportionate share in contributions

from the various socio-economic strata in the community may be necessary, as well as regulations to limit the effect of differences in level of development and social organization.

Furthermore, other than financial proofs of village interest may be demanded. This may take the form of a written request Arole and Arole, 1972, BURGEAP, 1974, Donaldson, 1976, Pineo, 1976, c, d), a successful history of supply promotion (BURGEAP, 1974), an offer to provide local labour, materials and cash (Donaldson, 1976; Pineo 1976 a, c) or land and housing (Arole and Arole, 1972; BURGEAP, 1974) and the expressed intention to assume responsibility for the administration (Pineo, 1976c). Other criteria may be the availability of time (BURGEAP 1974, Republic of Colombia, n.d.), and the existence of organizational capacities in the community, evidenced by the presence of village institutions. These institutions can assume responsibilities in implementation and continuation (Republic of Colombia, n.d.; World Bank, 1976).

Demanding the presence of such organizations without assisting in their creation where they are lacking may lead to increased inequity. Experiences with the Regional Development Fund in Tanzania showed that the more prosperous regions, with their more competent staff, better infrastructure and better services, were more effective in organizing projects, while some of the more remote and backward regions returned large sums unspent (Chambers and Belshaw, 1973).

Finally, it may be necessary to pay some attention to the degree of socio-cultural homogeneity. Most of the successful agricultural and health projects reported by Morss et al. (1975), and the UNICEF/WHO Joint Committee on Health Policy (1977a) for example, were characterized by a high degree of homogeneity of the participating population.

2. THE MEANING OF COMMUNITY PARTICIPATION

Röling, in an introduction to the International Meeting on Community Education and Participation in the Slow Sand Filtration Project (WHO/IRC, 1978), distinguished three approaches to rural development. The first two approaches, called the 'do to' and 'do for' approaches respectively, are characterized by the absence of any direct community participation in the decision process. These approaches only differ in that in the former the programme had already been developed beforehand, while in the latter the target groups are studied, and programmes are adapted to their special requirements, preferences and problems.

The opposite of these approaches occurs in community development programmes which are based on the definition of 'felt needs' by the community itself, and the organization of cooperative action to fill these needs (Foster, 1973).

This approach, which can be called the 'do by' approach, implies that the villagers or their leaders can identify their common problems, can reach a consensus on their priorities, and find suitable solutions with limited or no assistance from outside. In most cases, such an independent approach cannot be realized, and a compromise will be called for: the 'do with' approach, in which agencies involved develop the programme together with the community for which it is intended.

The degree to which people can participate in the various phases of an environmental sanitation project, and the number of people who can do so, will vary from situation to situation.

White (1978) developed a scale of community involvement in water supply programmes which includes the following categories:

- 1) a. Consultation with community representatives, or leaders, to ensure that the programme introduced by the outside

agency is adapted to the needs of the community, and avoids difficulties in implementation.

- 1) b. Consultation with other members of the community, or specifically, the poor to ensure that the programme meets their requirements.
- 2) A financial contribution by the community towards construction.
- 3) Self-help projects in which a specific group of beneficiaries contribute labour (perhaps also materials), especially in construction work, to reduce costs. There is a large input from the external agency.
- 4) Self-help projects in which the whole community collectively contributes labour (perhaps also materials), especially in construction work. There is also a large input from an external agency.
- 5) The training of one or a few community members to perform specialized tasks (e.g. village health worker, or operator of a slow sand filtration system).
- 6) Mass action: collective work aimed directly at an environmental change of general benefit, e.g. draining waste water (distinguished from self-help by the relative unimportance of any input by an external agency).
- 7) Collective commitment to change personal behaviour, and collective social pressure for the realization of such changes (e.g. construction and use of a latrine, frequent hand-washing with soap).
- 8) Self-reliance in the sense of the autonomous generation, within the community, of ideas and movements for the improvement of living conditions, as opposed to stimulation by outside agents. The community may well have recourse to external agencies to help with implementation of these improvements.
- 9) Self-reliance in the sense of using only the efforts of the community members themselves and not appealing to outsiders for help.

10) Self-reliance in the sense of using local materials and manpower, rather than collecting funds internally in order to purchase goods and services from outside; including increasing local capacities with this kind of self-reliance as a goal.

The concrete meaning given to the concept of community participation will depend on political factors, the type of technology, the availability of community resources and manpower for local education, training and supervision. In some programmes community participation may emphasize the planning and implementation phase with limited involvement in the maintenance phase, because the agency has an adequate maintenance service. In other programmes self-help labour is not feasible because of a shortage of supervisors, or for reasons of technical feasibility, but local operators and health workers are trained. In other programmes again, village institutions may be set up responsible for the management of the systems, and for the realization of an improvement in other environmental sanitation conditions and behaviour.

No matter what form or forms are chosen, some elements are essential to the 'do with' approach. First of all, there should be a continuous dialogue with as many community members as possible, involving all village categories to assure maximum acceptance and minimal constraints (White, 1978; WHO/IRC, 1978). This dialogue should not be pro forma, but should result in adaptations being made wherever necessary. This means that plans drawn up by the agency are flexible or, ideally, that the plans are jointly drawn up. The responsibilities of both parties should be clearly defined and adhered to. This approach demands the acceptance of a - varying - degree of decentralization; good lines of communication between the community and the various levels of the agencies; the training and supervision of those community members who have a specific function within the

programmes (ranging from an informational and publicity task to maintenance, operation and administration of a water supply and sanitation scheme, or even the full initiation and implementation of action programmes); and the proper functioning and coordination of the various agencies and agency departments which are involved in the programme.

3. INTEGRATED PROGRAMME DEVELOPMENT

The objectives of rural water supply and sanitation programmes will, in the first place, be the continued and proper use and maintenance of the technological facilities. To effect this, motivation and education must be an important part of the programme initiation activities.

An equal amount of attention should therefore be paid to the technical and the social aspects of the programme. This has important consequences for manpower-planning and training.

The integration of an educational component in all phases of the programme will also be necessary for a greater health impact. Not only should the facilities be properly used and maintained, but a lasting change in public and private sanitary behaviour should be brought about.

A second condition for an optimal health impact is the integration of the various technological aspects in the overall environmental sanitation programme. When an improved water supply system is successfully adopted, but no attempts are made to improve other environmental sanitation conditions such as excreta disposal, waste disposal, vector control and drainage, no optimal health impacts can be expected. A package approach to environmental sanitation is therefore advocated, linking minimally the supply of safe drinking water, proper excreta disposal, and sanitation education.

One problem is that these programmes are often the responsibility of different agencies. They concern partly public and partly private facilities and behaviour.

Where other felt needs or serious problems demand attention, it may be practical to integrate them into environmental sanitation programmes. Suitable links can for example be made with an improved health care system (e.g. a rural health clinic or dispensary with rural health workers), or a nutrition programme (e.g. vegetable gardening combined with irrigation, composting, nutrition education and malnutrition treatment).

With such an approach, a considerable impact on the general conditions in the community may be hoped for. An improvement in rural living conditions and economic prospects, can lead to a decrease in urban migration and provide a stimulus for the grouping of dispersed populations. The latter is one of the objectives of the Tanzanian water policy, which not only aims at the improvement of health and economic conditions, but also at an increase in self-reliance, modernization, education and political consciousness (Warner, 1969, 1975).

These objectives cannot be realized, however, without the development of fully integrated programmes. Especially for the educational component needed to realize the first two objectives, an inter-agency cooperation at all levels will be essential right from the start. Links with agencies and departments engaged in fields in which off-spins are possible, or desired, should also be made early in the programme development phase. The importance of cooperation, coordination and communication between the various agencies and departments is further discussed in chapter IX.

4. PREPARATION FOR LOCAL PLANNING AND IMPLEMENTATION

Although a clear programme policy and higher level planning on the one hand, and a continued higher level support on the other, are important conditions, the success of a rural or urban fringe water supply and sanitation programme will for the greater part depend on the activities at the local level.

For the proper planning of these activities, the agency will need considerable background information about the communities, their structure, culture, interpersonal relations and environmental sanitation conditions, together with insight into perceptions, knowledge and behaviour.

Oberg and Rios (1955), explaining the failure of an integrated rural development project which included a latrine building programme, remarked: "If as much attention could have been devoted to examining the people of Chonin and their mode of living, as was devoted to formulating programme policy, chances for success would have been much improved".

On the other hand, the community will need to gain an insight into the existence and scope of environmental problems, the various alternative solutions, their feasibility and consequences, the various impacts the project may have on the quality of their daily life, and the many types of contributions by which they can optimize these impacts.

This exchange of information between the agency and the community can have a triple function. It can provide the information necessary for detailed planning, so that weaknesses can be identified and where possible avoided, and all available village resources and stimulating factors can be used. Secondly, it can create a community awareness and understanding of the project and its 'do with' approach, making environmental sanitation a

felt problem, which can be solved through cooperation between the community and the programme agencies, and which may pave the way for further self-sustained development efforts. Finally, the data collected during the information gathering process can serve as a baseline for evaluation.

In the next two chapters the topics for this two-way flow of information will be discussed. The information about the community is discussed first, although this order is psychological rather than chronological, in order to stress the importance of local conditions and perceptions. A strict chronological separation between the information output and input would be an artificial one. With the acceptance of community involvement throughout the programme, it would be unthinkable that an agency should start a data collection process without discussing its objectives and approach with the community. Community involvement in this stage, which will be further discussed in chapter IV on methodology, has an added function in bringing information home to the community.

The amount of time and effort needed in this phase may vary considerably with the degree of community interest and the capacities present in the community. Cardenas (1978) distinguished three types of community responses encountered in rural water supply programmes in Paraguay: communities where water supply and sanitation problems were felt by the entire village, where they were only felt by the leaders, and where they were felt by the sanitarian. This resulted in the establishment of very flexible programmes, which in the first case were limited to assistance in community organization and joint programme initiation. In the second case the leaders were supported with all available media, including a locally planned sanitation education programme in primary schools, to motivate the other villagers. In the third, the most difficult and time-consuming

case, various surveys were carried out with the involvement of the villagers, a motivation and education campaign was set up, and assistance was provided in solving other, more deeply felt village problems.

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PROGRAMA NACIONAL
DE
SANEAMIENTO BASICO RURAL

It is important to "translate" the country's policy on community water supply and sanitation programmes into conceivable terms for all concerned. (brochure: Instituto Nacional de Salud, Bogota, Colombia)



(photo: courtesy of Dr. B. Mabrook)



(photo: courtesy of Dr. A. van Wijk)

The collection of information about existing village conditions will include the observation and recording of water sources and collection practices.

II INFORMATION ABOUT THE COMMUNITY

From the literature abstracted in the second part of this report, we can derive various categories for the collection of information on communities which are involved in a rural water supply and sanitation programme.

These categories are:

1. GENERAL VILLAGE CHARACTERISTICS

DELIMITATION OF THE VILLAGE AREA

In some cases, it may be necessary to pay special attention to geographical or administrative divisions. In Nigeria, extended villages are found with a central village surrounded by its satellite-hamlets (Röling, pers. comm.), while in Brazil the *prefeitura*, rather than the community, is the administrative centre at the local level (Oberg and Rios, 1955; Rogers et al., 1970). In Tanzania, Ujamaa villages are subdivided into ten-house cells (Hall, 1978; Kreysler, 1970; Van der Laak, 1969). In a Japanese demonstration project on community health, one of the lines of community organization followed was the use of the traditional division into ten *burakus* (old villages), of which the community was a conglomeration (Miyasaka, 1971). Scotney (1976) stresses the importance of the local path network as a source of information on community subdivisions.

SOCIO-DEMOGRAPHIC AND CULTURAL COMPOSITION

Knowledge of the socio-economic and demographic structure and cultural variability of the community is very important.

Socio-cultural divisions may exist according to caste, ethnic or tribal groups (which may include linguistic differences), political and religious affiliations, and socio-economic class based on income, material wealth, and education. Household composition and age structures may vary considerably. Such information will be very important for programme planning and implementation, for the drawing of stratified samples when these are used in further data collection (Curtis, 1977a), and for the analysis of differential impacts.

VILLAGE LEADERSHIP

Another important topic for pre-investigation is village leadership. That the village authorities can and have to play an important role in the various phases of the programme is self-evident, but leaders of voluntary associations (such as religious and political associations, farmers', women's and youth groups, and even very specific organizations, such as funeral societies (Messing, 1968), school leavers' unions and tribal unions in the city (Cardenas, 1978; Lovell, 1978; White, 1978), can also make contributions to the adoption and continued use of communal and individual environmental sanitation facilities.

Finally there may be special opinion leaders for matter of health, water, village technology, or community affairs, who may or may not overlap with the previous leader categories ¹⁾.

¹⁾ In general, the number of opinion leaders who are accepted as an authority on a variety of topics (polymorphism), (Merton, 1957), increases with the growing modernity of the village; whilst in the more traditional villages, different opinion leaders are found on different issues (Bhatnagar, 1972; Rogers and Shoemaker, 1971).

Holmberg (1952), for example, found that one of the factors contributing to the failure of a water supply project in Peru had been the neglect to consult an important farmer in the area, who happened to be the local well digging expert.

Amsyari and Katamsi (1978) found that the inhabitants of East Java, Indonesia, distinguished between key persons in direct health affairs and in environmental health. When asked about their advice seeking behaviour, the respondents replied that, in matters of house construction, excreta and sewage disposal and insect-rodent control, the local administrator was consulted. His knowledge on these matters, however, was found to be below that of local health personnel and teachers, and his staff had the lowest scores of all key persons identified.

A similar distinction between opinion leaders in health and in community affairs was found by Tiglao (1963), when she evaluated a ten year public health programme in the Philippines.

VILLAGE POWER STRUCTURE

An essential factor in the success, or failure, of village development programmes is the way in which they can be fitted into the existing power structure of the community, without the risk of an uneven distribution of benefits among the population, or of the programmes being used as a weapon in intra-village conflicts.

The case studies of Feachem et al. (1978) in six villages in Lesotho clearly show the importance of a well-established and generally accepted leadership without open or latent conflict

between individual authorities, factions, classes or even sexes ²⁾.

Not only may the acquisition of control over the water source, waste treatment plant or water distribution system become the objective of the various parties, but the very project may become a political weapon, even with such apparently neutral activities as latrine construction and sanitation education. Akhauri (1959) described how a village cleaning campaign, set up by an enthusiastic schoolteacher, failed because all school-functions were dominated by either of the two village factions.

Timing may be important, as has been shown by Patnaik (1961) who described how the organization of well-digging parties occurred at the time of the elections for the village council, and became one of the issues for the election contest.

Early knowledge of such coincidences may prevent unnecessary project failures. It is better to suspend any material inputs until organizational problems, caused by local controversies or conflicts, have been solved.

EXTENSION WORKERS

The cooperation and coordination of the various types of extension workers, both government and non-government in many

²⁾ In two Lesotho villages controversies between men and women interfered with water supply management and maintenance arrangements (Feachem et al., 1978). In Tonga, the request of male family heads not to involve the leading women led to an initial failure of a sanitation education project. Although the men were formally leaders of the family, the women had a very high status and decision making power within the family (Fanamanu and Vaipulu, 1966).

different fields, such as health and health education (nutrition, family planning, mother and child health, school health education, health inspection), adult education, community development, home economics and agriculture (veterinary health, rural composting and biogas, etc.), is very important to the realization of the objective of either 'progressive' or 'self-sustaining' development. The various messages should be coordinated to reach various target groups, and one should avoid overburdening the community in terms of finance, labour and time. A knowledge of local persons and organizations active in these fields, and of the ongoing and planned programmes, may therefore be useful.

MARGINAL GROUPS

Finally, some special attention may need to be given to the identification of any marginal classes, groups or families in the community. Rogers (1962) categorized the adopters of new products, installations, ideas and behaviour as innovators (2,5 per cent), early adopters (13,5 per cent), early majority (34 per cent), late majority (34 per cent) and laggards (16 per cent). Identification of these categories in the community and adaptation of the programmes to their situation by involving them in planning, implementation and evaluation may limit any inequity effects the project may have.

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2. ENVIRONMENTAL SANITATION CONDITIONS

WATER SUPPLY

Choice of Sources In rural areas people usually have the choice of a number of alternative supplies, especially in areas with sufficient rainfall (In areas with outspoken dry and rainy seasons the collection of two sets of data may be necessary). They can go to rivers and streams, dig holes in or near river beds, use springs, wells, village ponds or dammed reservoirs, or rely on rainwater in stagnant pools or catchment tanks, and they can use one or a number of sources with varying frequency. White et al., (1972) found that the perceived range of choice in East Africa was up to 5 sources, with a mean of 2.3. The actual density, as recorded by the interviewers, could be as high as 16 sources per square mile. Through the individual decision making process, for which they developed a model, many sources are rejected, but decisions may change over the course of time. With the provision of an improved supply, the perceived range of alternatives may simply be extended, unless the new supply is recognized as superior, thus making a larger distance or payment for safe water acceptable.

Distribution of Access Various types of access may need to be recorded. First, there is geographical access (Curtis, 1977a), determined by the area whose inhabitants will use the supply. This provides an indication of the minimum reticulation which will ensure all users reasonable access to the improved supply. Secondly, there is physical access; or the efforts and technical means necessary to get at the water (White et al., 1972). Thirdly, social access (Curtis, 1977a, Patnaik, 1961), such as problems in the sharing of a village water tank by the higher and lower castes.

Water Collection at Source Great national, regional and local differences may exist in water collection patterns. The following information will be useful for the design of the new facilities and for the more detailed planning of the programme: the volume of the water collected by the various user categories; the type of containers used; the frequency and time of collection; the waiting time; the sex and age of the collectors; and the transport facilities used.

When children are frequently involved in water collection, for example, this will have consequences for the design of standposts and pumps.

In addition, the information collected on these topics may also serve as a correction or reinforcement of the community's perception of the situation.

Water Journey Great differences may also be found in the water collection distance and the time needed to cover this distance (e.g. in hilly country). In the dry season, up to four hours were needed for water transport in Ethiopia (Kebede, 1978), which is exceptional. In East Africa, the mean time spent daily on collection, as recorded by White, et al. (1972), was 61 minutes in hilly areas and 27 minutes in more even country.

Technical Evaluation of the Supplies This includes water quantity, reliability of the supply and water quality. For the latter, it may be useful, from a health education and health impact point of view, to include tests of water sampled at various points between the actual supply and the point of consumption, where pollution or contamination may occur, such as around the source and in containers used for transport and storage (Feachem, 1977). Heijnen and Conyers (1971) reported that Kreysler (1970b) found acceptable concentrations of coliforms at improved water supplies in Ismani, Tanzania, but the water from the overflow, which was also used for drinking water,

was very heavily polluted. Coliform counts of water from the supply carried home in debes (kerosene tins) also indicated a significant increase. Feachem et al. (1978), had similar experiences in Lesotho, when measuring pollution in collection vessels and storage vessels. Storage in separate vessels increased the degree of pollution, since they were rarely cleaned, while collection buckets were rinsed at every trip.

Water Use Measurement of water use may take into account the single and multiple use of a load, the volume used directly and the volume stored, storage provisions, primary and secondary use e.g. for washing and watering of vegetables, and the feasibility of a division in consumption and working water (Curtis, 1977, a).

Traditional Supply Organization In some cases definite patterns of social organization may exist in relation to water control and distribution (Whyte, 1976). Knowledge of these patterns can be useful in the planning and implementation of construction, operation, maintenance and administration of the new supply, and may also help to avoid negative impacts, such as loss of employment for water haulers.

Sometimes customary laws exist on source protection, water use rights and responsibilities for maintenance. In some cases, the households concerned may take the initiative to carry out periodic clean ups. In other instances users are forced to comply with community norms on pollution and maintenance by comments and group discussions at the source. (McCullough et al., 1969; White et al., 1972).

Customary methods may exist for the management of fishponds or small irrigation systems, or communal property may be endowed to a village institution like a temple or church (Feachem et al., 1978). Lees (1973) found many local variations in such provisions for small scale irrigation, reflecting local

circumstances. Knowledge of existing social forms for the care of other communal facilities, such as a palm oil press (Obibuaku, 1967) or a market (Jackson, 1956) may also be helpful.

The existence of any local experts in water and waste disposal as well as general technical matters (Holmberg, 1952; Dubey, 1968) may have already come to light with the investigation of special opinion leaders.

Water Practices Finally, an investigation into the occurrence of specific water practices, such as covering the top of the container with leaves, or rushes, to limit the spilling of water during the journey (White et al., 1972), using a communal dipping vessel (Scotney, 1976), and habits of bathing, swimming, clothes washing and cattle watering may provide useful entry points for a sanitation education programme. Positive practices may also exist, such as digging a hole in, or near, the river bed and using the sand as a natural filter (Dobyns, 1952; Scotney, 1976; White et al., 1972) or handwashing before meals and after work (Messing et al., 1964). A classification of water and sanitation habits into good, neutral and bad (Holmes, 1964; Vervoorn, 1972) may prove useful.

WASTE DISPOSAL CONDITIONS AND PRACTICES

In addition, data on the waste disposal situation may be collected, such as on the number, condition and place of refuse pits and compost heaps, drainage at water sources and in village streets, the number and types of latrines, the quality of their superstructure (permanent or provisory, covered top and seat, ventilation and water, rat-proofness, etc.).

The actual use of the facilities may show great variations.

After all, latrines may be easily converted into maize stores or hencoops, just as in the past Dutch showers were often used for storing pitcoal.

Skoda et al., (1977) give a 59,9 per cent reported use of latrines (46,2 per cent of them being of the open type) for adults in 120 villages in Bangladesh, but only 12,8 per cent for children, remarking that among the adults it was usually the women who used a latrine. Of the 525 latrines installed under the Gorakhpur Environmental Sanitation Project in India, serving 11 per cent of the households, 23 per cent had covered seats and 20 per cent had water stored near the latrine. More females used the latrines than males, and children's faeces were thrown on garbage heaps which were also frequented by older children to perform their natural functions (PRAI, 1968). The incidence of intestinal parasites in schoolchildren in a Philippine barrio was the only one of seventeen health indices which had not improved after a ten year rural public health programme. This was attributed to unsatisfactory water supply conditions and latrine use (Tiglao, 1963).

Occupational differences may also influence the use of latrines: shopkeepers saw greater advantages in them than farmers (PRAI, 1968). Information on the occurrence of regular patterns for excreta disposal in the field (Kochar et al., 1976; Kochar 1977) may be useful for adapting the programme to the needs of the latter group, something which was omitted in a latrine building programme against schistosomiasis in Egypt (Sandbach, 1975).

Defecation habits in the field may also point to informal uses of excreta for productive purposes. These practices were found to exist in various forms in Latin America, although they were less universal and more taboo than in Asia. Nevertheless, such informal and individual practices could be used as a starting point for the introduction of productive waste disposal systems (World Bank, 1978).

3. PUBLIC HEALTH

EXISTING HEALTH CONDITIONS

A study of the existing health conditions should survey the distribution of diseases in the area, its morbidity and mortality patterns in general, and the incidence of water and sanitation related diseases in particular (Feachem, 1977a). In some cases nutrition may demand specific attention, so that special inputs, such as a food-for-work programme during the construction of the facilities, or additional agriculture or nutrition projects (improved agricultural seeds, vegetable gardening, school feeding etc.), are called for.

PRIMARY HEALTH CARE ORGANIZATION

In the paragraph on village characteristics the link with programmes for preventive health has already been mentioned, but two aspects may need some special attention: the presence and functioning, or intended formation of village health committees (Isely and Martin, 1977), and the existence of school health education as a subject in the local primary and secondary school curriculum. Orientation on activities carried out in their context may open ways for cooperation in, or integration of, an environmental sanitation programme.

HEALTH KNOWLEDGE, ATTITUDES AND BELIEFS

The investigation of water and sanitation practices has already been mentioned in chapter II. In addition, information should be collected on underlying health and sanitation beliefs and

attitudes, as well as on the degree of knowledge of the relation between water, sanitation and disease. This information can be used in the sanitation education programme.

Specific beliefs may exist, such as concerning the purifying influence of the sun on water, the idea that running water is always safe (White, 1974), that fermentation makes homebrewed beer safe regardless of the quality of the water used (Messing, 1970), that the faeces of children are harmless (PRAI, 1968), that the faeces of fathers and daughters should not be mixed (Hall, 1978), that cattle do not pollute water (Messing et al., 1964), that washing with cold water causes disease (Scotney, 1976), that bad smells cause disease (Messing, 1970), and that using the bush as latrine is more hygienic (Chandra, 1964; Hall, 1978).

In addition, more general attitudes may exist on the causes of disease in general, and water-related diseases in particular (Bennett et al., 1964; Chen, 1970; Dube, 1956; Gould, 1965; Lindenbaum 1968; Mann, 1967), on their seriousness and on their avoidability.

In Latin America and the Indian subcontinent many cultures classify diseases into hot and cold, which leads to a totally different interpretation of the relation between disease, food, drinks and medicines (Logan, 1973; Lozoff et al., 1975).

Wellin (1955, 1975) described the problems of a rural health worker in a Peruvian village when introducing the boiling of drinking water in the 1950's, as boiled water was culturally linked with illness.

Some people may have sufficient knowledge of the relation between water, sanitation and diseases ³⁾, but do not think these

³⁾ This knowledge may vary considerably for the particular diseases. In a latrine adoption programme in 15 Indian villages knowledge about the symptoms of dysentery and cholera was much higher than about typhoid or hookworm, while only cholera was recognized as an infectious disease (PRAI, 1968).

diseases serious, or say that they have a natural immunity, or that they will not be exposed to them (Kar, 1970; Vertinsky et al., 1972).

In other cases, particularly in areas with a high incidence of these diseases, they may be considered unescapable.

When a sample of 250 inhabitants of Ibadan, Nigeria, was interviewed during an outbreak of cholera, 98,8 per cent was aware of the epidemic, and over 80 per cent knew how the disease was spread, but 70,8 per cent accepted cholera as an endemic disease (Adeniyi, 1972). Nevertheless, recent or previous experiences of an outbreak of a highly infectious, water-related disease in the area (De Guzman, 1977; Medis and Fernando, 1977), or in a neighbouring district (Scotney, 1976) may serve as a special entry point for a water and sanitation action programme.

PERCEIVED HEALTH BENEFITS

Improvements in personal and family health may not be among the first of the advantages of an environmental sanitation project as seen by the villagers. Appreciation of a rural composting project was mainly economic, with health rarely mentioned spontaneously as a reason for adoption, although an extensive health education campaign had been included in the programme (Srivastava, 1969).

Adopters of latrines in Gorakhpur, India, appreciated the privacy and convenience more than a decrease in disease (32, 21 and 11 per cent respectively). Health advantages were seen even less by non-adopters (PRAI, 1969). In the same project, adopters of handpumps appreciated the provision of pollution-free water most of all (61 per cent). Non-adopters, however, named convenience as the greatest benefit (83 per cent), when questioned on the perceived advantages.

In four case studies on improved water supplies in Kenya, the perceived benefits for personal and family health, varying from 8 to 21 per cent for children and 5 to 9 per cent for the female respondents themselves, were much lower than those for farming and cleanliness (Whiting and Krystall, n.d.). These and other data (Feachem et al., 1978) suggest that, without health education, no link may be seen between safe water, good sanitation and other household benefits (such as improved personal hygiene, the facilitation of the washing of clothes and utensils, and the cleaning of the house) on the one hand, and improved family health on the other.

4. ECONOMIC CONDITIONS

MIGRATION

Some economic data will need to be collected for their direct relation to the planning and implementation of water supply and sanitation programmes, such as the existence of (seasonal) migration, which may influence the feasibility and timing of self-help programmes for the construction of the supply. When studying the difference in latrine adoption in a Brazilian village, where only the wealthier families responded readily, Oberg and Rios (1955) found that the heads of the poorer families were either dead, ill, gone away or were migrant agricultural workers living in rented houses, and that neither tenants nor owners were interested in any house improvements. High male migration may also mean that women, rather than men, should be trained as operators and administrators (Feachem et al., 1978).

SELF-HELP CONTRIBUTIONS

The inventarization of the existing organizational capabilities and technical skills has been mentioned earlier in this chapter. What, however, are the capacities of the various groups in the community to contribute economically to the project in cash, local materials, labour, transport and services?

What are the payment histories for water (e.g. through vendors), schools, clinics and similar services (Curtis, 1977a; Scotney, 1976)? Data on the spread of income over the months of the year, can also be useful for later arrangements on the frequency and timing of water rate payments (e.g. linked to the harvesting and marketing season for cash crops).

VESTED INTERESTS

When existing supply organization and water journeys are studied, the information on source ownership and professional water collection should be analyzed.

How serious the short term negative impacts of a piped supply may be on some groups is illustrated by Jakobson et al. (1971). They found that in the control area of a water supply study 30 per cent of the farmers and 12 per cent of the villagers employed water haulers. In the area with a piped supply, this percentage had dropped to 10 per cent of the farmers and none of the villagers. Similarly, local sweepers (Streefland, 1977) may find themselves out of a job with the installation of latrines which are connected to disposal, decomposition, or sewage systems, instead of being cleaned by more labour-intensive methods.

PERCEIVED SOCIO-ECONOMIC IMPACTS

Another topic for investigation which can be used for impact evaluation is the intended use of wastes, time-gains and increased water quantity, access and reliability.

White et al. (1972), have attempted to measure the economic impact of water supply improvements in terms of health costs¹⁾ and time and daily energy gains through shorter water journeys: while Curtis (1977, a) and Feachem et al. (1978) used time budgets, or the relative amount of time spent on productive, domestic, social and leisure activities in a woman's day during the peak agricultural season.

Jakobson et al. (1971) found great differences in formal and informal social participation in women-groups, cooperative societies, local councils, school boards and churchgroups between a central Kenyan water scheme area and a control area. Such socio-economic impacts may be perceived by the community members, as happened in four other Kenyan villages, where - in order of importance - general farming benefits, household benefits and social benefits in the form of more time for the attendance of meetings and adult education classes were mentioned by the women respondents (Whiting and Krystall, n.d.).

If the supply is expected to serve productive purposes, like vegetable gardening and dairy cattle production, or even to be used for fire protection, larger water quantities and better access may be necessary, which may have consequences for the design and the siting of the supplies. The presence of grade cattle, in particular, can contribute considerably to the

1)

It is estimated that in Thailand 100.000 tons of rice are lost each year to ascariasis alone. People have to eat that much more food just to compensate for what is taken by the worms. (WHO/IRC, 1978)

appreciation of the economic value of an improved supply (Fenwick, n.d.; Jakobson et al., 1971; Vierstra, 1977; Whiting and Krystall, n.d.), provided the design and management have been adapted to it.

Where such expectations on secondary uses of a supply are frustrated, negative attitudes towards maintenance can follow. The prohibition of irrigation and cattle watering in water supply schemes in Embu and Kitui, Kenya, was one of the factors identified by Scotney (1976) as contributing to their poor record of damages and non-payment of water rates. Similarly, the acceptance of the use of waste for composting or biogas, may require adaptations in designs and programmes (World Bank, 1978).

GENERAL ECONOMIC CONDITIONS

The production situation in the community may be such that additional stimuli are necessary before people can optimally profit from the improved circumstances.

Therefore, a more detailed study of the general economic conditions, such as sources of income, divisions and size of landholdings, farm implements, labour division etc. may sometimes be necessary (Kebede et al., 1978). A rigid division of labour may increase rather than alleviate the workload of the rural women. From four case studies on improved water supply in Kenya, it emerged that water carrying by housewives as the only water carriers in the family increased as the distance to be covered by them decreased (Whiting and Krystall, n.d.). A similar situation was found in Guatemala (World Bank, 1978). Investigation of the number of head of cattle and their estimated increase may necessitate adaptations in design (size of

supply, cattle watering facilities, prevention of damage and pollution) and management (Chambers and Belshaw, 1973; Hima, 1976). The economic conditions of some groups may also be a barrier to the improvement of sanitary behaviour, e.g. by factors which prevent them from boiling their water (Wellin, 1955, 1975), buying soap regularly, or acquiring hygienic water containers and filters. Such conditions demand special adaptations within or to the programme, e.g. by changing the sanitation education messages or developing local solutions (see chapter VI).

5. ENVIRONMENTAL SANITATION PROGRAMME PERCEPTIVES

In the preceding categories, the perceptions of the economic and health benefits of environmental sanitation improvements have already been mentioned. The collection of more detailed information about such perceptions may be a valuable contribution towards the collection of more objective data on environmental sanitation, health and socio-economic conditions in the community, since such perceptions will greatly influence the use and maintenance of the completed facilities.

FELT PROBLEMS AND PRIORITIES

The condition for the successful adoption of innovations that "they should answer a felt need" is a rather vague one, because there are many unsatisfactory conditions in rural communities, and any offer to improve one of them may immediately make it a priority in the list of village problems. Nevertheless, a clear picture of village problems in which water, environmental sanitation and preventive health do not play a prominent role, may

exist in some situations, which may have consequences for the information input of the programme and may even affect its feasibility.

Perception, by the villagers themselves, of the specific problems as studied under the existing health and environmental sanitation conditions (such as reliability of the supply, including drought experiences - Versteeg, 1977 - taste and appearance of the water, time and effort needed for water collection, and smell, fly, rat and safety problems of waste disposal facilities) will also provide some background knowledge on how people feel about their situation, and thus help to shape the list of topics for discussion with the community.

Even when community representatives themselves have taken the initiative to request an environmental sanitation programme, it may be necessary to find out whether this was done because the community, as a whole, realized its desirability on health grounds, or whether the initiators requested the programme for other reasons, e.g. political (the local M.P., for example) or professional (the local health inspector).

ADDITIONAL PERCEIVED BENEFITS

There may be many perceived positive impacts of a water and sanitation programme other than just economic and health benefits. Thus, people may favour adoption of the facilities as such, without any accompanying changes in hygienic behaviour or increased development in other fields. Educational programmes which stress the intended benefits as well as the perceived ones will be needed, to achieve all the objectives of the agencies, and not just the adoption of the innovation itself.

Favour for the adoption of a household latrine may find its origin in its compatibility with value systems demanding privacy and seclusion for women, its convenience to the sick, the aged and those people with a profession which ties them to the house (PRAI, 1968). It may also become a status symbol (Chen, 1969; Feliciano and Flavier, 1967; Kar, 1969; Krishna, 1967; PRAI, 1968). The opposite may also occur, however. De Winter (1972) mentioned Hopper (1967) who described how, in Malawi, villagers were ordered to construct latrines during the colonial days. This resulted in a large number of latrines being built, but certainly not in them being used.

Latrines became associated with the idea of colonial power so that, after independence, not to have a latrine was considered to be a sign of political integrity rather than of poor hygiene. Similar experiences with a compulsory construction programme were gained in Guatemala (World Bank, 1978). Nearly half of the families of the three highest castes in an Indian village rejected latrines, because they could afford to hire the service of a sweeper, as befitting their prestigious position (Chandra, 1964).

Similarly, other environmental sanitation facilities may be accepted, for reasons of convenience, to raise the family or village status in intra- or inter-village competitiveness, or simply to comply with government wishes (Dube, 1956).

CONSTRAINTS TO IMPROVEMENTS

Not every improvement introduced in the community will be appreciated by all the villagers. The innovations may lack specific cultural, economic, education or sociability functions. Obibuaku (1967) reported how a quickly adopted hydraulic palm oil press was abandoned just as quickly by the village women,

because they had lost the by-products of the old method, which were their traditional labour reward. Foster (1962, 1973) explained the rejection of smokeless stoves in India and Iran as being due to the fact that they did not keep away the mosquitoes and the roof-destroying white ants.

The innovation may also have some flaws in its cultural compatibility: the water provided by an improved system may be found unsuitable for cooking traditional dishes (Patnaik, 1961; Chandra, 1964; White, 1974), or may have an unpleasant taste (Frankel and Yoomee, 1973; White et al., 1972; Whyte, 1976), the smokeless stove may interfere with cooking and waterpipe smoking habits (Chandra, 1964; Dube, 1956); the design of the facility may not be in accordance with the local motoric patterns, of which latrines not adapted to a squatting position are the best known examples (Foster, 1952; Rogers and Shoemaker, 1972). The opposite may also occur. In a case study in Mexico latrines adapted to the traditional practices were no longer acceptable for the majority of the population, who knew about flush toilets through their work in the tourist industry and other outside contacts (World Bank, 1978).

The same problems affect water supplies. In India a protective parapet changed the women's posture, thus making water collection more exhaustive in their view and causing long waiting times (Dube, 1956, 1958). In Tanzania a foot pedal for pump priming had to be adapted to operation by children (Chesham, 1970). Other problems may spring from a culturally wrong siting, e.g. toilets facing Mecca (Goyder, 1977), or adjoining ones for male and female employees (Marinoni, pers. comm.).

Some people may fear a negative impact on the traditional role of education for women and children (Dube, 1956; Misra, 1975; Versteeg, 1977), others may object to losing a much valued gathering place for women or courting youngsters (Foster, 1962, 1973; Whyte, 1976).

On the other hand, the perceived necessity for social contacts through such common facilities may also be overrated. White et al. (1972) found that East African women preferred to use private sources instead of communal ones. This finding was also reported for a number of Latin American countries (World Bank, 1978).

People may doubt whether an improved supply will alleviate the problems of the old one, e.g. in matters of pollution (Misra, 1975), and reliability (Misra, 1975; Twumasi et al., 1977). They may mistrust government intentions (Ademuwagun, 1975; BURGEAP, 1974; Dube, 1956; Messing et al., 1965; Misra, 1975; White et al., 1972), or technicians (Derryberry, 1954), doubt the appliance's ease of operation (Kar, 1970), or have a highly unrealistic expectation on the impact of the project, such as the disappearance of all intestinal diseases.

Others may lack the willingness to walk a larger distance than the next rainwater pool, to reach a better quality supply. In highly rural areas of East Africa, over 50 per cent of the respondents were against payment for water (White et al., 1972) which is not surprising since water has usually been a free commodity in these areas. Misra (1975) and Chandra (1964) also found expected payment for a water or filtration service a constraint to the adoption of an improved supply. Such information will again provide matter for discussion in the dialogue with the community and will suggest adaptation of the message, e.g. that the water itself is still free but that payment is required for better quality, quantity and reliability.

Finally, the villages may vary in their willingness to cooperate within the community or with neighbouring communities, especially when facilities have to be shared, or when the scope of the project is extended.

When investigating these perceptions, it may be necessary to pay special attention to those groups which are potential stumbling blocks in the adoption process, such as village authorities and leaders of the various subdivisions, traditional medical practitioners, local water and sanitation experts, water vendors etc.

UNDERLYING VALUE SYSTEMS

In its paper on health education, the Eastern Mediterranean office of the WHO (1977) stressed the importance of building education on value rather than attitudes. The value of children is a universal one which fits very well into a health education programme, but other values can also be used. Stress can be laid on the prosperity, well being, good name and enhancement of prestige of the family or kingroup (Dube, 1956), while unity of the village may be a value despite an obvious lack of co-operativeness (Foster, 1973; Miller, 1965; World Bank, 1978). Making provisions for the future may be little valued, as experienced in a dam building project among Navajo Indians. Voluntary labour was not given until the project was translated into terms of bargain and obligation (Hall, 1964). In the Philippines, use was made of the hiya complex, whereby a person loses face when he does not fulfill a public commitment (Feliciano and Flavier, 1967). Links with religious and traditional concepts and practices of hygiene (Ademuwagun, 1975; Foster, 1973; Gupta, 1970; Khare, 1962; Kochar et al., 1976; Kochar, 1977; Singh, 1966) may also be helpful.

6. COMMUNICATION PATTERNS AND ADOPTION OF INNOVATIONS

COMMUNICATION CHANNELS

For an effective extension approach, some information on existing and potential communication channels will be very useful for the adoption of new technologies and behaviour. Information could be collected on the existing communication network within the community, with its key persons, key occasions and key locations such as a weekly market (Tomic et al., 1977), post-office (Morfitt et al., 1969), after-service meetings at a church (Pacey, 1977), evening gatherings under the village tree (Misra, 1975), fairs (Courtejoie et al., 1978), religious fiestas (Holmberg, 1952), and coffeehouses, treshing floors and bakeries (Derryberry, 1954), and the water collection sites.

Some gathering places and occasions such as annual fairs (Derryberry, 1954) and clinic waiting rooms (Locketz, 1976) will be less suitable, as people's minds will often be too pre-occupied with other matters. The absence of universal meeting places may require the creation of special public gatherings (Gumperz, 1964).

An inventorization of the modern and traditional, national and local extension media, in use as well as potentially useful, may also suggest ways for local involvement in the diffusion of information. Examples are: radio (with regional or tribal programmes), radio forums (Hall, 1974, 1978; Hall and Dodds, 1974), newspapers, posters, banners (Medis and Fernando, 1977), puppet shows, folk opera, street and radiocar announcers (Derryberry, 1954; Lin and Burt, 1973), local singers and storytellers (Gumperz, 1964; Patnaik, 1961), song and dance groups (Dube, 1967), and local drama groups (Kidd and Byram, 1978).

The presence of professional extension workers has already been mentioned.

It will be necessary, however, to pay some attention to the perceived credibility of these sources. Rogers (1972) reported research by Ramos (1966) and Herzog (1967), which showed that a high degree of government control had a negative influence on the perceived trustworthiness and competence of the media. Oyugi (1973) and Martens (1966) pointed at the prevalent disbelief in meetings with government officers, based on earlier unfavourable experiences, while Kidd and Byram (1978) developed their popular theater campaign, because interest in village meetings as a tool for village development was found to be steadily declining.

DECISION MAKING PATTERNS

Decision making patterns for community and individual affairs may differ from situation to situation. Cultural differences may exist in the role of women (Fanamanu and Vaipulu, 1966; Kebede, 1978). A village consensus may be reached in many ways, e.g. through authoritarian leadership, informal consultation or public confrontation (Whyte, 1976; World Bank, 1978), or through the acceptance of the majority's stand with the opponents either withdrawing or keeping silent (Dobyns, 1952). Patterns of advice-seeking behaviour, before any individual decisions are taken, may also show a varied picture (Amsyari and Katamsi, 1978; PRAI, 1968).

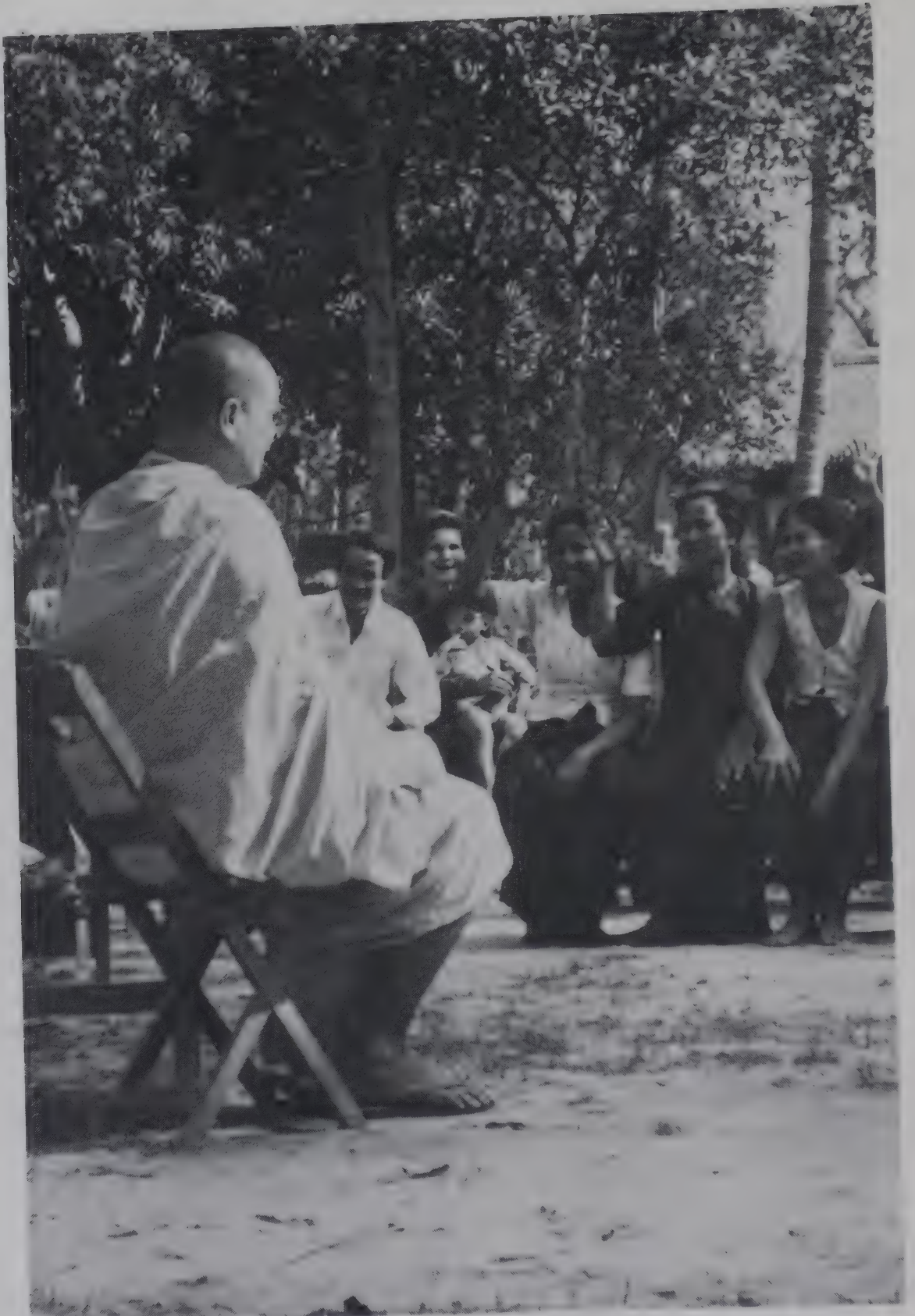
INTRA AND INTER VILLAGE RIVALRIES

The existence of intra and inter village rivalries, which may already have been uncovered in other categories of the information collection progress (e.g. under village composition and power structure, social access, willingness for cooperation) may constitute a constraint to the successful adoption and continuation of a project, especially when the design calls for a combined use of the facilities (Fanamanu and Vaipulu, 1966; Khare, 1964; Patnaik, 1961; Scotney, 1976), but it may also become a stimulant, because the various parties compete in the construction (Foster, 1962, 1973; Patnaik, 1961) or because the successful completion becomes a challenge (Holmes, 1964; Jakobsen et al., 1971; Van der Laak, 1969; Vierstra, 1977).

ADOPTION AND COOPERATION HISTORY

Fields in which information should be collected are the history of the successful adoption, rejection or discontinuation of previous innovations; the existence of a progressive and a conservative division regarding the adoption of innovations; previous experiences with development programmes of outside agencies (Morfitt et al., 1969); and the existence of traditional and modern cooperative patterns, like the dokpwe system in West Africa, the combite system in Haiti (Foster, 1973), the Shramdan system in India (Dube, 1956), the tequio system in Mexico (Lees, 1973; Whyte, 1976), the harambee system in East Africa, the Letsoma system in Lesotho (Feachem et al., 1978), and the system of traditional cooperatives in southern Ethiopia (Messing, 1968).

This knowledge will be useful for the involvement of the community in the construction phase. It may also reveal possibilities for the shared use and maintenance of private environmental sanitation facilities. The extended family and clan system, for example, favoured the adoption of comfort stations in Nigeria (Ademuwagun, 1976; Adeniyi, 1973; Pineo and Subrahmanyam, 1975). In Latin America a willingness to share latrines was found among those who lived near relatives or good friends with whom a day-to-day working relationship already existed (World Bank, 1978). Formal arrangements for maintenance, e.g. by special attendants or by the users themselves on a rota system, with sanctions attached, will, however, still be necessary in most cases.



To participate purposefully in the decision process, the community needs to be well informed about the project. (photo: UN)

III INFORMATION FOR THE COMMUNITY

The field studies, necessary for the collection of information on the topics discussed in the previous chapter, may in themselves spark off the interest of the community, as has been observed by White et al. (1972). They said "We were careful to avoid suggesting that the study would result in any direct action by public or private agencies and we guarded against raising false hopes, but we did not avoid stirring up local discussions of sources and their quality. Such discussions could hardly lead to anything but improvement, for they widened the range of choice in many instances and caused people to think about what could be done locally".

No less important, however, is the flow of information from the agency to the community, through which the community receives an answer to its (conscious and unconscious) questions resulting in further discussion and dialogue.

From the annotated literature, the following topics have been abstracted:

1. THE NEED FOR ENVIRONMENTAL SANITATION PROGRAMMES

ENVIRONMENTAL HEALTH CONDITIONS AND DISEASE TRANSMISSION

The picture emerging from the investigation of the sanitation and health conditions in the community will have to be shared with its members (Cardenas, 1978; Fanamanu and Vaipulu, 1966; De Guzman, 1977; Kreysler, 1970). When the information collected on their perceptions shows an insufficient realization of the need for a better water quality, quantity, accessibility and reliability, these aspects should receive special emphasis. One should demonstrate the link between poor water quality (whether at the source or between collection and consumption)

and the prevalence of certain diseases and their hidden costs. Similarly, the health advantages of hygienic waste disposal should be stressed; although other perceived advantages can also be discussed, like a decrease in smell, fly and rat problems; increased attractiveness of village and house; cleanliness as a village and household status symbol; greater household convenience and privacy; and use of waste for composting.

LINKS WITH SOCIO-ECONOMIC DEVELOPMENT

Although an improvement in local health conditions is the major objective of the programme, its socio-economic impacts and connections with other development activities, such as rural composting, livestock, breeding and husbandry, nutrition and family welfare may also be discussed, especially where there are specific problems on planned or ongoing programmes in such related fields. Cooperation between the various extension workers and coordination of their messages and approach is essential.

2. THE CHOICE OF SYSTEM

THE PRESENTATION OF POTENTIAL SOLUTIONS

On many occasions, there will be various solutions by which the sanitary goals can be achieved. Derryberry (1954), Vierstra (1977), WHO/IRC (1978), World Bank (1976), Whyte (1976) and Whyte and Burton (1977) among others, stressed the importance of presenting the community with the various technological solutions which are feasible, ranging from simple source protection and pit latrines to multiple house connections and other higher levels of service (Feachem, 1976; Versteeg, 1977; White et al., 1972).

Failure to do so may be an important factor in the ultimate failure of the project, when the service provided does not

correspond with the expectations of the community. Saunders and Warford (1976) reported how a water supply scheme for 400 villages in Latin America failed, because it provided public fountains instead of the desired house connections. Poor maintenance of the standposts and rate paying problems led to an extension of the scheme. A number of house connections were added, but this caused economization on the construction costs in order to meet the 'objective of 400 systems. The poor quality of the final supply systems caused frequent breakdowns, further problems in community contributions, and the ultimate abandonment of the scheme.

Whyte and Burton (1977) pointed out that community choice should include the possibility of rejection of any immediate source improvement, e.g. when the village prefers to wait until house connections for all can be afforded. Improvements in environmental health will then depend on individual water and sanitation practices, like water boiling and personal hygiene. Health education and village commitment will contribute to the programme continuing in spite of a rejection of direct improvements in the sanitation system.

Although this may seem a negative outcome, the authors argued that each community has its own criteria for calculating sets of trade-offs, so that their perceptions of the usefulness and effects of improvements may differ considerably from those of the agency. Besides, self-made choices will ensure a greater commitment than solutions presented from outside.

CONSEQUENCES FOR THE COMMUNITY

Representation of potential solutions, and their technical suitability, should include the consequences that they have for the community. There will be financial consequences such as the various installation costs and the proportion of them the community is expected to bear.

Some technologies will have greater potentials for self-help labour and use of local materials than others, and their use may have a cost reducing effect. Recurrent costs will vary, and a greater suitability for operation, maintenance and administration by members of the community may also cut down expenses.

Early information on the specific cost reducing effects of high quality voluntary labour may provide a stimulus to contributions and performance. Carruthers (1973), for example, suggested that the agency promise the calculation of the financial value of this labour, and translate it into the dispensation of water rates for a certain period, for the whole village.

In Colombia, each family that contributes labour is compensated in the form of a reduction in subsequent water rates in proportion to the value of the work done (WHO/IRC, 1978).

The community must be made to realize that the system that is the cheapest to build is not always the best bargain.

As a source for supply improvement in Funta, Tanzania, two wells were available, one at a distance of one kilometre from the village, but about 40 metres below it; and the other three kilometres away, at a site 18 metres higher. The latter site had a smaller flow, making a night storage tank necessary.

Although this second solution was more expensive and was therefore rejected by the village, the agency was able to demonstrate that the risk of breakdown of the pumps would necessitate a higher level of operation, maintenance and repair, that local materials would be used for building the tank, and that the recurrent costs of the petrol would have counterbalanced the higher costs of the tank (Matango and Mayerle, 1971).

These costs for the installation and operation of improved environmental sanitation facilities can be compared with the costs

of other improvements which may be felt needs in the community (Adeniyi, 1973; Misra, 1975; White et al., 1972).

There may also be consequences to the various designs for further development, such as the impact of water quantity and access on agricultural and livestock activities and the possibilities for the recovery and recycling of waste products, while inequity effects of the various designs should also be a point for discussion.

The complexity of the design will usually correspond to the complexity of organizational arrangements. With a simple design, a caretaker may suffice for the regular control of the maintenance of the improvements (such as parapet, platform and drainage). This person can also carry out simple repairs, and ensure proper collection practices without wastage or pollution, e.g. by preventing the priming of handpumps with dirty water, Raman (1962).

Caretakers can be given additional sanitation education tasks within the health education system. More complex designs will demand increasingly complex arrangements for operation, maintenance and administration, so that for a continued involvement the training and supervision of more voluntary or paid community members are required.

Through a discussion of such consequences of the various technical possibilities, the community will go beyond its first interest, which is often limited to the direct costs and the level of service. A better motivated choice, made by the agency and community together, can then be expected.

3. AGENCY EXPECTATIONS OF COMMUNITY ROLES

CONDITIONS FOR IMPLEMENTATION

In some cases conditions have been laid down by the agency to test the community's willingness to participate actively in the programme.

Apart from paying a deposit, which may already be a selection criterium, participation may consist in the removal of public dung hills and rubbish heaps (Funck, 1976; Holmes, 1964), site and access road preparation when no siting problems have to be solved, the construction of animal enclosures, the building of concrete platforms before installation of a handpump (Raman, 1962), the stocking of local materials, reforestation of the catchment area, etc. A discussion of these conditions and their fulfillment by the community will of course be necessary.

PARTICIPATION IN THE PLANNING AND EXECUTION OF THE INSTALLATION

After participating in the choice of the system, the community is expected to contribute in the actual installation of the facilities. This contribution may take many forms, from physical labour to the housing of the construction team. Although most details will have to be arranged at a later stage, the community will have to know whether it is expected to contribute labour, cash, service or materials, and what responsibilities it will have in the organization of these contributions.

In Jamaica for instance, the construction of new water supplies is the full responsibility of the national water authority (Lawson, pers. comm.); while in Bangladesh and India, contractors are used (Pineo, 1976, b; Sandhu, pers. comm.) and in the Dominican Republic a combination of self-help labour and contractors (Pineo, 1973, 1976a).

Other possibilities are a food-for-work programme, the use of local labour hired by the agency or by the community itself from village contributions (Patnaik, 1961), the use of voluntary labour, or any combination of these approaches.

PARTICIPATION IN OPERATION, MAINTENANCE AND ADMINISTRATION

The community should have a clear view of the contributions expected from it after the completion of the systems, and of the increased public health risk when an improved supply intensively used by a great number of people is not properly maintained and used.

The community may have to provide local people to serve as caretakers for the supply, or people to be trained in operation, maintenance and administration. Occasional voluntary labour may be needed for some maintenance or repair tasks, which may or may not be compensated for in some form.

In most cases there will be water rates to repay construction loans, pay operation, maintenance and administration costs, and prepare the way for future extensions, possibly environmental sanitation improvements in other communities. It may be useful to stress here that rates have to be paid by all users, and that penalties should be attached to non-payment. Such rates may pay no regard to the varying distances to the nearest supply point or to the volume used, which may influence the willingness to pay. Both Chandra (1964) and Scotney (1976) found that people living farther from an improved supply were less willing to pay the full rates. Whether rates should be flat or weighed (e.g. according to the volume used as registered by water meters, to the walking distance involved, or to the income of the users, perhaps even in the shape of levies on cash crops, White, 1978), will depend on

many circumstances, but early discussion of this topic will help prevent payment problems later on.

Finally the agency may have some ideas on the appropriate structure for the village administration of the environmental sanitation system. Two basic opinions have been voiced in the literature reviewed.

Firstly, Feachem et al. (1978) insist that the agency choose the most appropriate overall system for village level management of water supplies. They developed a typology for such a choice, advising the use of democratically chosen committees (see chapter VII), while Curtis (1977a) developed three administrative models: direct administration, self-help and controlled self-help. Such a standard approach ¹⁾ does exist in many Latin American countries, but the type of service provided is also fixed at a high level (piped supplies with house connections using community adapted financing), which will not be possible in many other countries.

Whyte and Burton (1977), on the other hand, criticized the lack of flexibility in rural water supply programmes through lack of community decision making on technologies and management systems, and stated that the standardization of community participation schemes in patterns of cooperatives, or elected committees, does not allow scope for the finer nuances of community organization and social differences.

They pointed out that, even within a confined and homogeneous area, subtle differences may exist. In a study of 22 villages in the Oaxaca valley in Mexico, a compact unit with few ecological and socio-cultural differences, a great variability

¹⁾ although some flexibility may exist, e.g. in the size of the administrative committee (Republic of Peru, 1977).

was found in arrangements for maintenance and administration of the irrigation system, including water allotments and water rates (Lees, 1973).

Just as is the case with the choice of technology, a more gradual approach may be called for, for instance by discussing the need for some kind of institutional arrangements first, and the range of choices open, while later on a joint decision is taken by the community and the agency, based on the social and organizational structure of the community as well as on previous experiences of the water agency.

PUBLIC AND PRIVATE SANITARY BEHAVIOUR

When the community realizes the need for environmental sanitation programmes, it should also realize that its health objectives in particular are not reached without changes in the behaviour of the people. When evaluating village water supplies in Lesotho, Feachem et al. (1978) found no differences in the water-health relationship for villages with and without an improved supply. They concluded that a package of environmental sanitation facilities should be provided, including pit latrines, provisions for bathing and clothes washing, and better curative services, and that a programme of health education directed at specific unhygienic practices was necessary.

Similarly, Levine et al. (1976) found that tubewell users in Bangladesh did not have a lower incidence of cholera and other diarrhoeic infections than non-users, but that families with a high socio-economic status, as indicated by the presence of one or more high school graduates, had a lower incidence, whether they used tubewells or not. They suggested that factors like personal hygiene, nutrition and the degree of crowding are responsible for these differences, and stressed the importance of health education.

Health education and the availability of safe water and waste disposal facilities should be coupled with an optimal prevention of wastage and damage to equipment. Vandalism and wastage in public places, as well as pollution of a source and its surroundings, or a village area, can sometimes be curtailed by the intimation of sanctions, e.g. fines.

Very often, however, the point of view of the villagers is quite understandable. When the pipeline of a water supply system is exposed near a dried-up cattle watering place, it is not surprising when the pipe is found to have burst "spontaneously" one day. When the pipes are buried at an inadequate depth, and the course of these pipes is not generally known, it happens that they sometimes get damaged. (Scotney, 1976). The opening and closing of various types of taps may be less easy than it seems for people who have little experience with modern technology, and may be a source of curiosity and an invitation to experimentation to youngsters (Matango and Mayerle, 1971). Erosion of the soil because of an increase in cattle is a logical consequence of improved cattle watering in pastoral areas without ranching schemes (Heynen and Conyers, 1971). Neither is it surprising that people wash and bath under a running tap, when one realizes that this was formerly done in a stream or spring (Scotney, 1976). Most of the changes that are necessary for a better health impact concern private behaviour, however, and can only be brought about voluntarily. With little social control these changes will be the most difficult to realize.

Perhaps a more effective way of dealing with the problem of damage to public facilities, rather than by the threat of punishment, would be through a combination of community participation and education, starting with the consultation of the community in the planning phase. An explanation of construction regulations is to be given to any voluntary workers.

The education programme for users can be directed at the change of negative practices, with active involvement of the target groups (e.g. through role playing and group discussion at the site). Where necessary arrangements for supervision should be made.

Some of the ways in which this can be done have been discussed in a separate chapter (Chapter VI.).

A first step towards the necessary changes will be the generation of a community understanding of the need for adaptations in public and private behaviour, and of a willingness to participate in special activities to realize these adaptations.

4. ANSWERING COMMUNITY EXPECTATIONS ABOUT THE PROGRAMME

Although information on the consequences of the programme for the community, such as water rates, labour contributions and cash deposits will have answered many village questions, care should be taken that unrealistic village expectations are corrected. Problems were encountered, for example, with the expectation of compensations for labour (Pacey, 1977), and the secondary uses of water (Scotney, 1976; Vierstra, 1977; World Bank, 1978). Other topics for discussion are the use of discharge and drainage water, the provision of additional facilities, such as cattle troughs and wash and shower places usable free of charge, and the supposed complete disappearance of water-related diseases. The information given by the agency can also be adapted to the barriers identified in the community analysis, such as mistrust of government intentions and perceived ability to pay water rates, using messages especially designed to reach the various types of opposition registered (Misra, 1975; Morfitt et al., 1969).



Visits to prototypes or demonstration projects can spark-off discussions on the suitability of the innovation, e.g. on its ease of operation by the various user-categories. (photo: IRC)

IV OPERATIONALIZATION FOR PROGRAMME DEVELOPMENT

1. METHODOLOGY

Having discussed what information the community and the operating agencies may need to develop an environmental sanitation programme with optimal community involvement, the next question will be how this process of mutual discovery can be realized. As Whyte (1977) said, this is achieved by using one's faculties of sight, speech and hearing. In the case of environmental sanitation, even the sense of smell may play a role.

For extension and health education, it is now fully accepted that there should be a continuous two-way communication. The best way of providing this two-way flow is through community participation in the process of education itself (WHO/IRC, 1978). This is easier to accept for the information to the community, where the old didactic approach has long been rejected - at least in theory - than for the information about the community. Participation in the collection of baseline data will of course depend on the sophistication of the methods and techniques chosen, and the capabilities of village members. As early as 1954 Derryberry stated that "it is not necessary or desirable for the sanitarian to gather all the information himself. Instead, considerable impetus should be given to the educational programme if, through their own efforts or study, the people discover for themselves answers to many of the questions."

Curtis (1977a) who designed a number of before-after studies on the socio-economic aspects of a water supply programme, using observation, questioning (both in formal census and informal interviews), measurements and records, remarked that several

of these studies can be carried out by an intelligent enumerator under the direction of a study supervisor.

Hall (1978 b) greatly emphasized the need for participatory research, because it is a process which is part of the total educational experience serving to identify community needs and to effect increased awareness and commitment. The commonly used surveys give a static picture of what members of a community, as individuals and not as a group, give as answers to fixed questions, a process which may often force them to choose one definite answer where they may feel there is not just one, or even that the question itself is not the right one to ask. An enquiry into habits of sterilizing clothes in a case of diarrhoea for example, may produce the boiling with detergent for an answer since this is recognized as the ideal practice; while in reality a shortage of firewood, or lack of money for detergent, may prevent people from doing so. ||

After an extensive study on public health in Ethiopia, using questionnaires on health knowledge, practices and beliefs together with environmental and medical surveys and analyses of records and health centre functions (Spruyt et al., 1967), Messing (1976) concluded that such motivational surveys only measure ideal culture. A World Bank Study in 8 Latin American countries also rejected the sociological survey when this had not been supplemented by qualitative research. Observation, oral history taking and projective techniques will place survey answers in their right perspective and are alternatives for questions to which no direct answers can be obtained (World Bank, 1978).

Another advantage of participatory research will be that, right from the start, the community will appreciate the nature of the approach advocated for the rest of the programme. Such a consistent adherence to one of the principles of the whole

programme may also allay any scepticism on community participation through discussion meetings (see page 56), and remove mistrust of government intentions as to slum clearance (Messing et al., 1965), taxation (Dube, 1956; White et al., 1972) and eviction (World Bank, 1978).

In the following general outline, some suggestions for community involvement in the information exchange process have been included.

OBSERVATION

Some information can be collected through direct observations, e.g. of the number of sources available and used, the frequency of use, pollution round the supply, observable water practices and type of containers etc. One example of involving the community in the use of this method is by organizing an "environmental sanitation walk", as a variation of the "urban walk" (Whyte, 1977).

When using this data collection technique, the investigator can record the reactions of the participants when they observe environmental sanitation conditions in their villages. Thus their perceptions of these conditions can be measured, but he may also use the walk as an educational tool. Indirect observation can also be used to collect information about the community. The width and the wear of paths may sometimes provide an index for latrine use, while the presence of a cake of soap in the house is an index of personal hygiene (Messing and Prince, 1966). Sometimes an investigator from outside the village may live for a longer period in the community to collect information. By participating in the daily village life, he can gain much insight into its less accessible aspects like factionalism and village resources.

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Checklists may be helpful in observation and in the less formal methods of questioning discussed below, as well as in informing the community and discussing further planning. Several of such checklists were added to the literature reviewed, e.g. on village and higher level management (Curtis, 1977a), on community participation, on health education and extension programmes, on community diagnosis, on higher level support and evaluation (Lovell, 1978), and on the elements of a maximal strategy for community participation, on external organizations which may play a role in an integrated programme, on information on water-related disease transmission and the tasks of the extension agents (White, 1978), and on sanitary conditions in the home, using sanitary improvement cards for self-checks and checks by voluntary health workers elected by the community (Miyasaka, pers. comm.).

CONVERSATION

Questioning. The most familiar way in which social information is collected is through interviews. These may be unstructured (or in-depth) interviews, in which no standardized questions are asked. This method is often used with key persons, like provincial and district water officers, water operators, health inspectors and other health staff personnel, extension workers, village authorities and other formal village leaders. They may also be necessary in interviews on a larger scale, e.g. when the use of printed forms makes people reluctant to answer questions, or when questions need to be worded differently on each occasion in order to be understood (Lees, 1973).

When questionnaires are used, the questions can be open-ended, as was with the case in the Delhi Pilot project in Urban Community Development, in which only six questions were asked to find out which of the problems were most urgently felt, the willing-

ness to do something about them, experiences in social and self-help activities, degree of opinion leadership and leadership capacities (Clinard, 1966).

Such more or less unstructured interviews can be personal ones, even using a house-to-house approach, as was the case in the Delhi project. They may also be group interviews, in which for example, neighbourhood groups, women groups and others are questioned, e.g. those working in the field or queuing for water.

From the above it is clear that sociological surveys are not the only approach. They are still frequently used, however, with various types of questions (pre-coded open questions and closed questions, multiple choice questions, scaled ¹⁾ and card question) and involving the whole population or a representative sample. Usually the person interviewed is the head of the household, although in the case of environmental sanitation, interviews with both male and female heads of families are desirable.

In the case of the men, the interview is necessary because, for one reason, they will be asked to contribute to the project and may hold the power of decision making; and in the case of the women because they are usually the ones who have to carry the water and who can contribute most to the impact on health.

Twumasi et al. (1977) and Wright et al. (1977) even interviewed children on water and toilet use. Whether these interviews with the various members of a family are to take place jointly or separately will depend on the culture in the area and the social class.

Kebede (1978) found that joint interviews produced more

¹⁾ Such as the semantic differential suggested by Padfield (1971) to measure immunity expectations and aspirations for water.

reliable data in an Ethiopian study area. This reliability may be different when respectively perceptions and knowledge are measured, as was experienced in a series of Latin American case studies (World Bank, 1978).

Apart from the types of questions already mentioned, two others can be used: sociometric questions to identify opinion leaders in such matters as preventive health, environmental sanitation and community affairs (Amsyari and Katamsi, 1978; Rogers et al., 1970) or to visualize communication networks within the community (Rogers et al., 1975), and projective questions, where people are invited to react freely to a stimulus. Examples of such stimuli are photographs (Ademuwagun, 1975; Quesada et al., 1975), and a structured scenario (White, 1978), to register attitudes and perceptions. When projective techniques are included, it may be considered desirable to use actual village situations as a stimulus. Although these questioning methods are in the first place meant for the collection of information about the community, they can also have a stimulating function by awakening interest in environmental sanitation (White et al. 1972).

The less structured interviews also afford a better chance of passing on to the "discussion" phase, and of obtaining genuine, instead of only "polite" answers, e.g. on village cooperativeness (Ascroft, 1974; White, 1978).

Discussion With the acceptance of community participation in as many phases of the project as is feasible, discussions with various people and groups in the community will be an important method for the education of the community, as well as for the collection of information about perceived problems, constraints to pollution control, village expectations etc.. In Cameroon, for example, information on decision making patterns

and village communication was gathered in informal village conversations by the mobile fieldworkers responsible for the organization of village health committees (Isely and Martin, 1977).

Such group discussion could vary from personal dialogues with male and female heads of households and with the village leaders separately to discussions with small and medium size groups. These groups may, for example, consist of the joint family leadership, the whole household, the family, formal and informal village leaders, health and extension workers, consultative groups or committees on environmental sanitation and village development; and neighbourhood groups and voluntary associations.

In Tanzania, special study groups were formed which, after jointly listening to a series of radio broadcasts on preventive health and environmental sanitation, discussed the contents of the broadcasts and their consequences for individual and group action, under the direction of trained group leaders from the village (Hall, 1974; Hall and Dodds, 1974; Hall, 1978).

Informal discussions of small groups of women proved a successful addition to a mass media and community organization approach to environmental sanitation in Durban, South Africa (Steuart et al., 1961). Similarly, the community health education programme of the Brazilian Adult Literacy Movement operates mainly by engaging the inhabitants of the communities in the discussion of their own health problems, after which programme monitors, who are members of the community, serve as coordinators of the community's efforts to solve their own problems (Backheuser et al., 1978).

Demonstration visits to testing sites of environmental technologies (Adeniyi, 1973; Obibuaku, 1967) or to other communities with environmental sanitation projects (Holmes, 1964)

could also spark off discussions.

Such an approach can also be used as a follow-up activity with larger gatherings, ranging from whole communities to wards and larger associations like churches, sects and political parties. They are first addressed by extension workers and figures of authority (village leaders, medical officers, etc.), or they attend mass-media performances such as filmshows (Matango and Mayerle, 1971), puppet shows and other traditional drama forms (Kidd and Byram, 1978).

Through such meetings it is also possible to use the sociometric techniques mentioned above (Kar, 1969), as well as projective techniques (Freire, 1971; USAID, n.d.; White, 1978).

COMMUNITY SELF SURVEY

A more ambitious method for the collection of information, which is at the same time an educational tool, is the community self survey.

With the collaboration of the extension agents, a group or groups within the community draw up a series of questions to which an answer is sought by various methods, such as through household and other interviews, observations, and the study of records.

Information can thus be collected by members of the community on facilities, behaviour, beliefs and attitudes (White, 1978), or on water and hygiene related diseases, time-budget and water use (Lovell, 1978). No high scientific standard can be expected from such information, however. Two self surveys were carried out in the course of a demonstration project in community health in Japan; one survey on fly breeding places and toilet facilities by Pupil's Health Groups consisting of upper grade primary school and secondary school students; and a sanitary facilities survey by Health Members, chosen representatives of circa 30

families (Miyasaka, 1971). Similar surveys were carried out by upper grade primary school students in Chan Kom, Mexico (World Bank, 1978). A self survey on the area characteristics, facilities, and conditions, as well as on the socio-economic and attitudinal characteristics of the inhabitants, is one of three village studies implemented by members of the community in the initial stages of a rural water supply and sanitation programme in Paraguay (Cardenas, 1978). Such activities have also been reported in two case studies in Guatemala (World Bank, 1978). An outline for such a survey based on experiences in the USA and the Netherlands is provided by Van der Lest (1962).

TESTS AND MEASUREMENTS

Laboratory tests are frequently made to obtain data, e.g. on water quality and parasitic infections. Field laboratories enable us to use these tests in the educational process, with a discussion of their results serving as an initiation for water supply programmes (Kreysler, 1970; Misra, 1975; White, 1974) or latrine construction programmes (Feliciano and Flavier, 1967). In the last case, the helminths found in the stool survey were kept alive in a large container to serve as an additional educational aid, together with microscope demonstrations and flannel board explanations.

Other measurements, such as of the distance to the supply, and of water collection patterns might even be carried out by enumerators from the community. Training and supervision, however, may be necessary to ensure the acquisition of reliable data. Warner (1969) reported how the villagers in Kipora, Tanzania, gave an average distance of 0.65 miles to a water supply in May, and an average of 0.16 miles for the same supply in September, while actual measurements gave an average of 0.43 miles.

On the other hand, such local participation may help in allaying fears of taxation (Curtis, 1977a; White et al., 1972). The latter researches reported that, in one area, the interviewer had to be widely seen in the company of a subchief before people were comfortable about revealing their water sources to him.

RECORDS

We can also use existing records, such as those concerning other projects and research in the area, water sales (Browne, 1974), mortality and morbidity records in hospitals, vital statistics (Levine et al., 1976; Misra, 1975; White et al., 1972), attendance records (Curtis, 1977a), and in records on the adoption of previous health innovations (Kar, 1969; Arango, 1973).

Even aerial photographs may be of use, to assist in the determination of geographical divisions, in cut-off studies (Curtis, 1977a) and in mapping for area sampling and house identification (Morfitt et al., 1969).

Since the number of records available and the information provided through them will undoubtedly be insufficient, Whyte (1976) has suggested the compilation of village books in each community, in which demographic and water supply data are recorded as well as personal accounts and pictures of village life, traditional concepts and practices, and the forms that village organization and social interaction take. Such a book could be compiled by the village teacher, who could involve parents in it as a school project and display it in a central place. Thus, it could serve as a source of information for various development schemes, as a learning experience in self-studies, and as a sign of the importance of local structures and culture.

Documentation by the agency may also be an aid to community information. Scotney (1976) found that in western Kenya there was a real need for informational sheets in the local language, e.g. for informing villagers of the possibility of group connections. Information on hygienic practices to improve health, as well as on wastage and spillage could easily be added. Although such pamphlets should not be considered sufficient in themselves, they can be useful in the initial information phase, and members of the community could be involved in adapting the information and suggestions to local circumstances.

2. MANPOWER

After the discussion of what information is needed by both parties, and how it can be provided, a third question remains: by whom should it be done? In the literature many different categories are mentioned, each with its own roles to play, including:

MULTIDISCIPLINARY TEAMS OF EXPERTS

A multidisciplinary team of experts, including social scientists, which conducts field studies of the existing conditions and/or develops rural water supply and sanitation programmes on a community basis, is recommended by Holmberg (1952), McGarry (1977), Messing et al. (1965), Oberg and Rios (1952), Scotney (1976), Stromberg (1978) and Whyte (1976). Scotney also stressed the importance of including female social experts in such teams. Experiences in eight case studies in Latin America confirm this necessity (World Bank, 1978).

The task of the social scientist would be to carry out baseline studies, including the investigation of the existing social structures, and their suitability for adaptation to water

supply administration. Some investigations could result in a reference catalogue of management systems, from which standardized organizational components could be combined - in consultation with the villagers - into an administrative system that is adapted to the particular circumstances and potentials of the community (Whyte, 1976). Their role in a sanitation education component of environmental sanitation programmes is not mentioned, however.

Although highly qualified people may be necessary for some aspects of the baseline study, e.g. the technological investigation of the existing supplies, water quality, specific health conditions, etc., it may be too expensive and time consuming to have all baseline topics investigated by such a team of experts.

The social distance between outside experts and members of the community may also limit their effectiveness in developing local programmes directly with the members of the community.

The task of technical, social and health experts may therefore be limited to the development of training courses for special intermediaries based on a series of field studies.

With the continued assistance and supervision of the former, the latter could perform a number of tasks in the collection of data the promotion of environmental sanitation programmes, including the development of administrative systems and health education programmes, and supervision during and after construction.

Such tasks could be assigned to a special service within one of the institutions involved in rural environmental sanitation programmes, to environmental health personnel already working in rural water supplies and sanitation, and to other extension workers and/or to community members remaining in their community.

SPECIAL SERVICES

In Latin American countries in particular, the task of initiating a rural water supply programme with community participation is assigned to a special promotion service within the central, or regional offices of the water agency (Donaldson, 1976; Pineo, 1975, 1976c, 1976d; Ramirez and Orozco, 1976; Republic of Colombia, n.d.; Republic of Peru, 1977).

Promoters are responsible for community organization and also have a health education task, but no links with other public health services at the various levels are apparent from the literature.

In Peru, the promotor is assisted by auxiliary promoters who are usually selected from the community and paid from the project construction funds (Pineo, 1976c). These auxiliary promoters carry out the socio-economic and population survey of the community, using two standard questionnaires. They also identify the premises suitable for house connections, motivate the community and assist in the election and the work of the administrative committee, before, during and immediately after the construction (Republic of Peru, 1977).

In Algeria, too, an intervention team is formed for consultation with the village leaders on matters of water supply (Funck, 1976), but no mention is made of any health education programme or arrangements for administration, operation and maintenance after the construction of the supplies.

Similarly, promotional services could be established within health education sections with additional training on the water supply aspects for health educators, but no examples of such services and training courses have been found in the literature reviewed.

When there are two main entry points into the rural society, namely "water" and "health", the establishment of a special service for the promotion of environmental sanitation involves the risk of an overlapping of the promotional activities. The responsibilities of these promotional services in relation to other services should therefore be clearly defined to avoid duplication (WHO/IRC, 1978).

ENVIRONMENTAL HEALTH PERSONNEL

Derryberry (1954), Pisharotti (1975), Raman (1977) and Scotney (1976) stressed the importance of training sanitarians and technical staff in health education and community organization. In the planning and implementation of environmental sanitation programmes, these aspects cannot be ignored. It is to be doubted, however, whether this staff can be made fully responsible for promotional and educational activities, even with a revision of their workload by the agency. An exception to this rule may occur when they are less highly qualified and stationed at local level, so that they can get an intimate knowledge of and good social relations with the community, as was the case in Guatemala (Buckles et al., 1978). Through their authority they can play an important supporting role in the information of those groups and individuals in the community for whom their word will carry weight, and mediate in conflicts by using technical arguments.

More training in the social aspects of their work will also be important for successful community participation in the planning of the programme and the construction of the facilities, since their guidance will be necessary for the members of the community.

EXISTING VILLAGES SERVICES

Instead of creating a special service within the departments responsible for rural water and waste disposal or rural health and health education, existing services at the village level can also be used. Social training could be provided to local health workers, and in particular to the primary health worker (McGarry, 1977; White, 1978).

In Canada, water supply projects, including maintenance and storage, were the first activities of Indian and Eskimo community health workers (Martens, 1977). Additional training and outside assistance for the organizational aspects of the technology programme will be necessary.

Where a special community development worker is present in the community, he could team up with the health worker. In Guatemala, special village workers for rural water supplies and excreta disposal are presently being trained. These rural water technicians are responsible for the technical work as well as for the organization of the community, before and during the construction phase, and for the maintenance of the system after the installation, while the health educational component is carried out in cooperation with the village health promotor (Buckles et al., 1978).

Other community workers e.g. in nutrition, adult education, agricultural extension, home economics, family welfare and school health education will usually have a supporting role. They may reach - slightly - different audiences, reinforce messages, and discuss the links with their own programmes. Care should be taken that such workers are involved from the planning stage onward, that they have a clear view of their responsibilities, and that they get from their own agencies the higher level support necessary for their cooperation in the programme (PRAI, 1969).

MEMBERS OF THE COMMUNITY

Some suggestions for, and experiences with, the involvement of local people in the analysis and education of the community, have already been given. The possibility of training certain members of the community for specific tasks in the process could be considered, although its success will depend greatly on the capacities available in the community, and on the training and supervision resources of the agencies.

Morfitt et al. (1969) recommended the selection of community surveyors and a village communication representative, who through progressive training can be prepared for later administrative functions. The authors consider this important, as it will ensure their continued employment, and improve the continuity of the programme. The use of local auxiliary promoters for such tasks in Peru has already been mentioned, as was the involvement of members of the community in the data collection for rural water supply programmes in Paraguay. In this country the information and motivation of the community is also carried out by some of its own members, organized in a subcommittee of the elected water board and assisted by the local sanitarian (Cardenas, 1978).

A common educational approach in Francophone Africa is rural animation. Elected representatives of the village are trained as "grass root extension workers" to initiate development projects in their village with the assistance of the service. This approach is also used in water supply projects (Bridger and De Soissons, 1970; BURGEAP, 1974; Hima, 1976).

The use of a primary health worker, as mentioned before, is another example of the combination of short and long term tasks in local hands, since in contrast to most other village service

workers he, or she, has long been a member of the community, and is expected to continue working there.

Village authorities, leaders and committee members are the community members who are most often involved in the preparatory stages; but usually their tasks are limited to consultation and motivation. A more active involvement in some parts of the community analysis could be considered, and their functions in providing feedback should be stressed. Future operators could also be involved in the analytical and educational process. In Bangladesh, such operators are also given a health educational task (Pineo, 1976b), but their educational activities are probably not started until after the construction of the supplies. Finally, as many other community members as possible should be involved, to ensure the representation of all interests and categories. Clear policy guidelines to this effect should exist and be adhered to. In Latin America, for example, which has the longest tradition in participatory water supply and sanitation programmes, women are often not involved in the planning and promotional stages. This can be explained from the traditional seclusion of women from decision making roles and the prevailing use of male promoters (World Bank, 1978).

3. INTERIM EVALUATION

To round off the preparatory phase in which the community increases its knowledge of the programme and the agencies involved extend their knowledge of the community, a joint evaluation should take place, resulting in recommendations and decisions for further action (Cardenas, 1978; Isely and Martin, 1977; Kreysler, 1970; Morfitt et al., 1969).

When general agreement has been reached on the necessity of an environmental sanitation programme; the type of facilities that this should embrace; the need for special sanitation education activities; the role the community will have to play in the construction, operation, maintenance and administration of the systems; and the introduction and continuation of appropriate public and private behaviour regarding wastage and hygiene, then a more detailed planning for the implementation will follow, with more consultation, agreement and recording of commitments and decisions.

V THE ESTABLISHMENT OF THE ENVIRONMENTAL SANITATION FACILITIES

1. LOCAL ADAPTATION OF THE CHOSEN DESIGN

The need for local testing of various designs is increasingly accepted, but possibilities for greater involvement of the community exist. When pilot plants are tested at a limited number of sites and visits are undertaken as part of the motivational and educational programme (Adeniyi, 1973; Obibuaku, 1967) immediate or later comments on its suitability for the particular village may be invited, although it may be difficult to persuade the visitors that local expertise and perceptions will be taken seriously.

Care should be taken that women, as the major users of water supplies, and in some cases the future operators, are included in such visits (Obibuaku, 1967). They could test the ease of operation, the taste of the water (for drinking and cooking traditional food) the washing of clothes without staining similar practical matters.

Adaptations can also be based on the financial capabilities as revealed in the community analysis (Morfitt et al., 1969) and on the registration of local discontent with existing designs (Blackmore et al., 1977; Feliciano and Flavier, 1967), which may also include suggestions for improvements from members of the community (Feliciano and Flavier, 1967) or their reactions to the designs which are tried out in situ. Such a procedure resulted in three types of latrines being selected from an initial eleven in an Indian programme (PRAI, 1958).

Adaptations as a result of the local information process, e.g. due to the sex and age of water haulers, washing habits and cattle watering, should also be referred back to the community. An example of such an adaptation is a childrens' latrine developed after an investigation of excreta disposal and hookworm problems in Uganda (Letlhaku, 1964).

Sometimes, the community may test or develop its own solutions, showing that village expertise may have a high enough standard to find solutions which are technically and socially acceptable.

Kreysler (1970) described how, in a Tanzanian village, the decision process on the type of a piped water supply system included the local testing of bamboo pipes. These were rejected after three months in favour of a more sophisticated piped system, as was a system of open concrete channels on the ground of its estimated construction costs.

In some cases, locally developed solutions may be the most suitable from a technological, financial or social point of view. Versteeg (1977) mentioned the development of a bamboo suction handpump and piped supply system by immigrants in Vientiane, Laos, and a water raising mechanism using a spongy material and a roller in Niamey, Niger. Cochrane (1970) described the design of a well by a local handyman in a resettlement project in the Gilbert Islands, which proved to be superior to those proposed by the WHO and less expensive than those developed by the public works department.

Dommen (1975) reported the construction of a bamboo tubewell by an Indian farmer. Shawcross (pers. comm., 1978) mentioned a foot operated shaded handpump for irrigation designed and constructed by another Indian farmer.

Whyte (1976) referred to the construction of stone and branch dams and bamboo aqueducts.

Such an acceptance of locally available creative resources fits in well with the ideas of intermediate technology, in which local materials¹⁾ are accepted in the construction of simple and cheap, but durable and easily maintained technologies.

2. SITING OF THE FACILITIES

During the preparatory phase, when the community have learnt about the programme and the agency about the community, an idea of the number and sites of water points needed in the particular village situation will have been formed. Problems of social access may demand adaptations to ensure an equal division of benefits, while the existence of rivalries between neighbouring villages, or subvillages, may be an unsurmountable barrier to the sharing of a supply (Scotney, 1976; Fanamanu and Vaipulu, 1966; White, 1978). Where attempts are made to gain sectional or individual advantages from siting, e.g. through the location of a supply on the land of a wealthy landowner (Bridger and De Soissons, 1970; Huizer, 1970), who may even try to sell this land first to the community at a high price (Vierstra, 1977), the agency may use its technical authority to stop such tactics. Pacey (1977) described how attempts by a local landowner in Tigre Province, Ethiopia, to

1) Examples of such local materials are green bamboo for reinforced concrete in latrine construction (Feliciano and Flavien, 1967), shredded coconut husks and burnt rice husks for water filtration (Frankel and Yomee, 1973), and indigenous plants for water disinfection (Langley, pers.comm.) and water coagulation (Pacey, 1977). The latter also mentioned the use of local expertise, such as traditional potters in Nigeria manufacturing aqua privy fittings.

have the proposed village well sited mainly for his own advantage were overcome through the joint discussion, inspection and selection of sites by village elders and water agency representatives, on criteria of general accessibility and probability of striking water. Vierstra (1977) also reported the successful use of technical arguments in such a case. Where construction activities will take place at a number of sites, it may be advisable to start with those in the poorer sections, to alleviate all suspicions.

A dialogue may also reveal special problems. Foster (1973) reported how, in a housing project, the kitchen tap suggested by the agency was rejected (after 57 depth interviews) in favour of a patio tap. This tap had been suggested by the respondents because of leakage problems with the other one.

Villagers in Ha Morerefere, Lesotho, complained that their gravity fed water supply was out of use for two to three months each year due to frost overnight. It used a spring on a south facing slope, while they had suggested one on a north facing slope which would have allowed the morning sun to thaw out the frozen tank outlet (Feachem et al., 1978).

The siting of waste disposal facilities may cause problems of water source pollution, necessitating special rules and supervision for their place of construction (Funck, 1976). Other projects may demand specific arrangements for facilities outside the house or compound, e.g. for households with lack of space (PRAI, 1968; Srivastava, 1969; World Bank, 1978), for children in urban fringe areas where both parents are working and their apartments are locked (Curtis, 1977b) near a mosque (Funck, 1976) or near the major bus-stops in the area (Hall and Dodds, 1974).

3. VILLAGE CONTRIBUTIONS

There are many ways in which a community can contribute to the actual construction of the facility. The most common activity in self-help water programmes is the digging of the trenches, but other possibilities are the organization and execution of the clearing and fencing of the site, building the access road, the collection, transport and storage of local materials, making cement, moulding of lining for wells and the actual lining of the well, the provision of food and drinks to the labourers, and the housing of a technician or technical team (BURGEAP, 1974).

Common activities in the construction of latrines are the clearing of the site and digging of the pit, the construction of the superstructure, and sometimes the mixing of cement and moulding of the sill, although this is sometimes set up as a village industry, commercially or on a non-profit making basis, e.g. at the local hospital.

The financial value of labour, local materials and services, in addition to any cash contributions, can constitute a considerable proportion of the total costs. Local contributions in Colombia were estimated to amount to 20 per cent of the construction costs (Ramirez and Orozco, 1976), a figure which was also mentioned by Donaldson (1976) as an estimate for the whole of Latin America. In Kenya, voluntary labour and local materials even covered 41 per cent of the total construction costs of 49 village water supplies (Whiting and Krystall, n.d.). The World Bank (1976) estimated that, based on the experiences of the Interamerican Development Bank in Latin America, communities may be expected to pay 3 to 20 per cent of the capital costs, with an average around 10 per cent. Studies of the Pan American Sanitary Bureau indicated that all costs of operation

and maintenance, and up to 50 per cent of the construction costs of simple systems built, operated and maintained with the assistance of the community, can be borne by the villagers (Morfitt et al., 1969).

In Lesotho financial contributions amounted to circa 7 per cent, although the villagers themselves estimated them at half of the total costs. From two examinations of self-help labour schemes it was estimated that the effective value of such contributions was 15-35 per cent of the material cost, while the authors considered that any saving in time on site that could have been realized by using contractors, would have been outweighed by the time required for drawing up tender documents and accepting a tender (Feachem et al., 1978). Such detailed comparisons may throw light on the question of the effectiveness of self-help, which has not been subjected to enough systematic experiments for us to draw definite conclusions on its profitability (White, 1974).

4. LIMITATIONS TO SELF-HELP

Apart from the time consuming character of the labour organizing process and the collection of cash contributions, other factors may endanger the success of environmental sanitation construction programmes with community participation.

Both Carruthers and Browne (1977) and Pacey (1977) warned against the overrating of self-help contributions. Pacey pointed at the frustration of the local population by an excessive and unrealistic load of work, poor standards of construction and the inefficient allocation of the central government inputs of money, skilled personnel, tools and machinery. Curtis (1977a) feared that costs of supervision and communication

personnel might surpass any financial gains on labour and material costs. In a Bangladesh well digging programme voluntary labour was relinquished in favour of authorized contractors, because lack of supervision led to the early choking up of the wells (Pineo, 1976b). A comparison of construction by agency personnel, by contractors and by village labour, voluntarily donated or in a food-for-work programme may lead to different results for different countries or areas.

One should carefully evaluate cost and manpower resources, needed and available, in the community and in the agency, to make the best arrangements in each case.

The motivational impact of self-help labour will be even more difficult to assess. Village involvement in the actual construction of the facilities will usually make the inhabitants feel more responsible for proper use and maintenance, and act as a catalyst for further development, but there may be general perceptions, former experiences and specific timing problems which will be a barrier to the successful use of voluntary labour. Then the results are not only raised costs and frustrations, but also discouragement rather than stimulation of a greater independence in village affairs and activities.

Villagers may be reluctant to provide voluntary labour for what is considered to be the work of lower classes or a government service (Funck, 1976; Khare, 1964) or request the use of labour from a nearby government prison (Feachem et al., 1978; Ketcham, 1970). The men may dislike giving their labour to a project which will primarily benefit women (BURGEAP, 1974) and which may change the women's traditional role (Misra, 1975). This may cause the burden of voluntary labour to come on top of the women's regular agricultural and household duties, so that they may feel that their health is affected (Whiting and Krystall, n.d.). The use of interesting new tools, such as

augers and drills, may make participation more appealing to the men (Foster, 1973).

There may also be a relationship between the amount of labour people will contribute and the benefits that they think will emerge from it. This is illustrated by the beehive catchment tank project in Botswana. The tanks were situated at the local schools, so that their benefit for the water collection journey was less than the villagers had hoped for. In addition, their construction demanded two to three times as much labour in comparison with other types of tanks. It was therefore not surprising that labour contributions were disappointing (Pacey, 1977).

In an experiment on the relationship between mass media and the adoption of health innovations in rural Ecuador, Spector et al. (1971) found similar indications of a relationship between adoption, self-help labour and the perceived advantages of the innovations. The adoption of four health innovations was studied, namely: latrine building, smokeless stove construction, marmalade making and smallpox vaccination. Latrine building, a relatively costly practice demanding five-men construction teams and giving delayed and less observable benefits, was the least popular; while the construction of smokeless stoves, also costly and labour intensive but with immediate and observable benefits, was more popular than marmalade making.

Moreover, there appears to be a "ceiling" for self-help activities, at least temporarily. In the same experiment, Spector et al. (1971) failed to find an increased adoption of the investigated health innovations when a combined mass media approach instead of a single one was used, while the three experimental villages showed a great similarity in average total expenditure in money and effort, regardless of which of the innovations

they adopted. The authors attribute this to the existence of a saturation point for innovation adoption in a community.

Fenwick (n.d.) noticed a similar reluctance to complement the adoption of a rural water supply and sanitation facilities at Zaina, Kenya, with the building of improved floors and fire-places.

In well digging programmes in Upper Volta and Niger, people were found to lose interest when the construction took more than three months (BURGEAP, 1974). Dube (1967) also mentioned the limiting absorption capacity of the community.

People may grow tired of self-help labour and cash contributions when this becomes the normal procedure with every development programme, without any substantial intervals of time in between. In Kenya, the increasing politicization of self-help projects has already led to a point where the population feels overtaxed. Chambers and Belshaw (1973) mentioned the decline in self-help projects, as reported by Almy and Mbithi (1972), due to the intervention of over-ambitious politicians and administrators, so that new self-help groups began to avoid registration.

Chege et al. (1976), reported the same tendency with a drop in harambee (self-help) group membership of 40 per cent in two and a half years, whilst church membership rose by 40 per cent in the same period. The creation of church credit saving unions may have contributed considerably to this development, however.

Specific negative experiences in previous programmes, such as projects which were never implemented, took a long time or were abandoned halfway, may add to a lack of enthusiasm. Sometimes contributions are forced (Chambers and Belshaw, 1973) or are felt to fall disproportionately heavy on the shoulders of the poorer classes, e.g. due to the fact that they have to do the

manual work, while the upper classes remain aloof (BURGEAP, 1974), or take up the tasks of supervision and organization (Dube, 1956). Earlier experiences with food-for-work programmes (Pacey, 1977), knowledge of nearby programmes without voluntary labour (BURGEAP, 1974) or knowledge of plans for a higher level service (World Bank, 1978), may also affect the willingness to engage in self-help. Morss et al. (1976) recorded how, in a self-help project in western Kenya, the local committee overcame the initial scepticism towards the project by using hired labour for the rapid realization of the first communal facility, a social hall. After that, all other facilities, like a maize store, a milk cooler and a cattle dip, were built with voluntary labour contributions.

There may also be specific timing problems, e.g. because of a harvesting season or culturally less suitable periods for voluntary labour, such as the Ramadan (Matango and Mayerle, 1971), while it may be difficult for the agency to plan the construction only in the slack village season.

Problems of migration (Feachem et al., 1978; Oberg and Rios, 1955) may add to the irregularity of available village labour. Factionalism may be higher at a time of national or local elections, and have a negative influence on the organization of village labour (Patnaik, 1961).

Such problems, brought to light in the initial dialogue between the agency and the various levels of the community during the preparatory phases (Chapters II to IV), will need to be solved through dialogue with the village institutions involved in the implementation.

5. DIVISION OF RESPONSIBILITIES

Clearly defined arrangements should be made for the division of responsibilities before and during the construction phase between the agency and the village institution representing either the community as a whole, or the future users of the facilities. Usually, this village institution will also be the one responsible for the village level management of the system in case some, or most, administrative responsibilities at the village level are delegated by the water, waste disposal, or health agencies. The various forms these institutions can take, according to the literature reviewed, will be discussed in Chapter VII.

In some cases, e.g. where well functioning traditional organizations for self-help exist, these can be used for the construction, while a separate organization may be set up afterwards for the management.

The supply may also be a combination of free public and paid private connections, whereby the village organization for the installation will represent the whole village, whilst the village organization for its administration will represent a group of users with house connections.

If in a certain country or area the village management system is uniformly prescribed, the specific organizational set-up will manifest itself during the presentation of the agency's plans to the community. If the choice of system is still open, the most suitable system will be one of the items of discussion between agency and population (see Chapter III).

Where initial conditions have been laid down, e.g. a village cleaning campaign, the collection of cash deposits, the afforestation of the catchment area, or the stocking of local materials, the village organization involved in the construction

phase may be made responsible. It may be given instructions on the procedure to be adopted for collecting any contributions, or it may be left to choose its own ways to reach the prescribed minimum, depending on the agencies' experiences and the information gained in the preparatory stages (e.g. earlier, negative experiences with self-help financial contributions). For example, a fixed initial rate paid by a certain proportion of the population may be demanded by the agency before construction procedures will be started; or the agency may establish a percentage that the community as a whole will have to contribute to the supply, this based on its capacities, and then leave it to the village whether this amount should be reached by flat contributions from all households, or from those wanting to join a users' association, or whether some kind of special taxation should be imposed. It may even be paid from existing village funds.

Where site preparation and collection of local materials are demanded before the actual construction is started, such labour may be seen as an alternative to an introductory fee, enabling the poorer households to join when this fee is higher than they can afford.

Whatever system is chosen, it is important that there is some kind of legal framework which gives the village water organization sufficient authority to solve problems of opposition and non-contribution. It may even be feasible to use positive, rather than negative, measures, e.g. by deducting initial contributions from subsequent rates, as is the case in Colombia (WHO/IRC, 1978). In an environmental sanitation pilot project in Tonga, the costs of the installation of water supply house connections were paid from the village funds for those villagers, who had completed the construction of a sanitary latrine within eight weeks. These and other official and non-official

premiums had been suggested by members of the community themselves and accepted during open village meetings (Fanamanu and Vaipulu, 1966). Also, instead of demanding afterwards a higher contribution from families joining water supplies already built by other users' groups, the lower cost of early participation and joining may be stressed, in order to persuade more people in the pre-construction stage.

During construction, the village organization will usually be in charge of village labour. The necessary supervision could be given by a technician with some training or experience in community organization, or by a community development worker. The authority of the village organization and the supervisor in this phase, will need to be clearly defined, so that problems of insufficient organization, absenteeism and the like can be solved by one or the other.

Confrontations should be avoided as much as possible. A small fine may work with absenteeism in voluntary labour teams, but where there are great differences in social status, a choice between voluntary labour or a larger cash contribution may be given.

Such a flexibility in self-help labour arrangements, enabling the community to choose its own solution, but with outside support and authority to legalize decisions and fulfill obligations, may result in a variety of organizational set-ups, as shown by Patnaik (1961). In one village, work proceeded along the traditional lines of village work-teams with a schedule being prepared each evening in the presence of all the villagers. In the second village, a well committee was formed, framing daily work teams for which each family was to provide one free or hired labourer. In the third village, two wells were to be built, and each well was assigned to a group of 60 families, subdivided into 6 groups of 10 labourers who chose

their own leader. In the fourth village, labour was hired from a fixed subscription per family. The fifth village organized a food-for-work scheme for the voluntary labourers, and a sixth village, joining the project although it was situated outside its area, made cyclic arrangements for free labour from each family.

An essential will be the proper registration of the responsibilities of both parties. Cairncross et al. (1977) and Feachem et al. (1978) advise the development of a model constitution for village water committees. For the construction of the supply, contracts can be drawn up (Patnaik, 1961; Pineo, 1976a, b, c, d; Republic of Peru, 1977). White (1978) suggests a joint programme meeting in the community at which the technical staff of the water agency agrees with the community on the lists of operations, the division of responsibilities, the timetable, the lines of communication for progress reports and problems, and implementation methods and their feasibility; see also Van der Laak (1969).

Some special efforts may be needed to ensure that such records are accessible for all members of the community, e.g. by disseminating simple information pamphlets, as practiced in Peru (Republic of Peru, 1977), or using a bulletin board.

To finalize the construction period, a - traditional - inauguration ceremony may be held (Adeniyi, 1973; Cardenas, 1978; Frankel and Yoomee, 1973; Holmberg, 1952; Ketcham, 1970; Matango and Mayerle, 1971; Scotney, 1976).

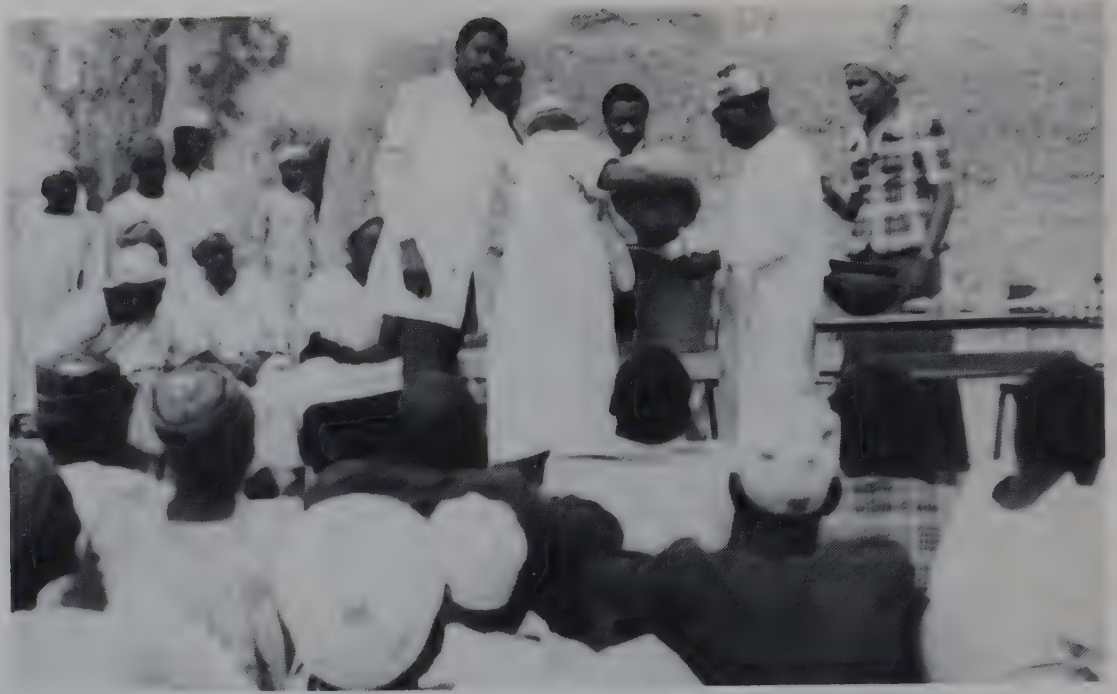
On such an occasion one can formally transfer to the community and its water, sanitation and sanitation education organizations such responsibilities as have been previously agreed on, like protection against misuse and damage, the improvement of hygienic practices, or even the full legal ownership of the system.



Advice from a sanitary technician on the construction of a private sanitary latrine.

(photo: UNICEF)

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Demonstration of water filtration
through a piece of Muslim cloth.
(photo: courtesy of Mr. Essien,
Dept. of Community Medicine, Ahmadu
Bello University, Nigeria)



Extension worker in discussion with the
village health committee. (photo: WHO)

VI THE PLANNING AND IMPLEMENTATION OF THE SANITATION EDUCATION PROGRAMME

The link between environmental sanitation and preventive health will have been an important subject in the information given to the community during the preparatory phases of the environmental sanitation programme. The knowledge gathered on specific health problems and public and private health conditions will have been of assistance, especially when the community have been involved in the collection, analysis, and discussion of the results. This in turn may lead to the conclusion that a special sanitation education programme, adapted to local conditions and practices, is necessary. Added to this, some structure will be needed for the organization of such a programme. Optimal local involvement is necessary to increase the commitment of the community, and to continue the activities after the completion of the facilities.

Such programmes should stress the sanitary behaviour related to the use of the facilities as well as more general personal and household hygiene. At the same time, they could point out the importance of proper handling of the facilities to prevent unnecessary damage and wastage.

This chapter gives only a very general discussion of such a sanitation education programme during the planning stage (objectives, target groups, media, methods, and aids), to underscore the need for the integration of such programmes into the total planning of a rural water and sanitation programme.

The organizational structure for village participation in sanitation education will be discussed in the next chapter, as it is even more important as a part of the programme component or continued functioning and use of the facilities, than for the adoption of the facilities.

1. LOCAL OBJECTIVES AND TARGET GROUPS

An important part of the educational programme after the discussion of the information resulting from the preparatory phase, will be the joint listing of specific objectives for change in public and private conditions and behaviour. These objectives should be realistic rather than ideal. It will be useless, for example, to advocate the use of proper water containers in every home, when these are not available locally, or cannot be afforded by the majority of the population. Other solutions should then be sought, such as the purchase in bulk (White, 1978). Manufacturing with local craftsmanship (e.g. water filters from local pots, ENDA, 1977), or the construction of a watertap in a village defecation area (Curtis, 1977b) are other examples. The message itself can also be adapted to local realities, e.g. by stressing that excreta should be covered and that defecation should take place at a sufficient distance from any water source (Kidd and Byram, 1978; Spruyt et al., 1967). The use of a three pots system for sedimentation (Van Amelsvoort, 1969), is another suggestion, or the use of furrows in the field for excreta disposal and of the crests for walking, to prevent hookworm infection (Kochar, 1977).

Socio-cultural research on local sanitation habits could provide the necessary information for such sanitation education programmes, which use an adaptive and flexible approach aimed

at the reinforcement of positive practices (Khare, 1962; Kochar et al., 1976; Kochar, 1977). Feedback from the users will produce more realistic objectives, adapted to the particular circumstances of the community or target groups (Curtis, 1977b).

A FAMILY ORIENTED APPROACH

Specific target groups will also have to be identified for a continued sanitation education programme.

Wagner and Lanoix (1958) suggested that a health educational approach starts with people who come to a health centre or a dispensary for treatment of water-related diseases, although this may be a minority of the population. After that the whole family should become involved. Similarly, health education may be linked to a medical survey on water-related disease (Feliciano and Flavier, 1967; Kreysler, 1970).

The disadvantage of such an approach can be that more attention is paid to those who are motivated by the existence of an immediate problem, whereas long range prevention of water and sanitation related diseases for the whole community is the ultimate goal.

The programme should therefore be set up in such a way that the villagers themselves draw this conclusion, and realize the necessity of permanent and general behavioural changes.

Within the family women will have a central role to play, since they are the main users of water, although the men may decide or be involved in decisions on financial investments.

In Tonga two village sanitation projects with a health education and community participation approach failed because the women had not been involved. The official and non-official male village leaders had excluded them from the planning and implementation of the programme, although women had a great influence and a high status within the family (Fanamanu and Vaipulu, 1966).

In some cultures, additional attention may need to be paid to the female head of the extended family, e.g. the mother-in-law.

When older children are regular water carriers or contributors to human pollution by their excreta disposal habits, they may become a special target group; but the behaviour of younger children can be influenced to a great extent by the mother. This is why the WHO Regional Office for the Eastern Mediterranean (1977) doubted the effectiveness of school health education, since the children's behaviour will have been formed largely in the pre-school period. Thus new behaviour, learned and to some extent practiced in school, may never be put into practice in the home.

SCHOOL HEALTH EDUCATION

The impact of school health education on family behaviour may, however, depend on the degree of cooperation which exists between the community, schools and homes (Ademuwagun, 1970).

In some communities parent-teacher associations may play a role, while the health education curriculum may be community orientated rather than academical.

The community may come to the school, e.g. when inspection visits are used for teaching purposes (Pisharotti, 1975). In a study of the change of health knowledge, attitudes, practices through school health education, Dwivedi et al. (1975) found that improvements were two to three times greater in those primary schools where the teacher was given a one week training course and was actively supported by the local sanitary officer than in schools, which followed the normal curriculum.

The school may also come to the community, as when the school health education is integrated in the local public health programme, with e.g. the construction of a rural water supply (Cardenas, 1978). Pisharotti (1975) and Courtejoie et al. (1978)

suggested more practical fieldwork, e.g. by identifying fly breeding places and latrine use. Such fieldwork by students from local schools was part of the data collection exercise in a public health demonstration project in Japan (Miyasaka, 1971). Students and teachers may also be involved in the information output phase, e.g. by organizing exhibitions or giving a drama performance on village environmental sanitation (Cardenas, 1978; Kidd and Byram, 1978; Locketz, 1976; Pisharotti, 1975). The importance of the establishment of early cooperation and coordination links between the environmental sanitation programme, village health officials, committees and the local schools has already been stressed as an activity in the preparatory phase. In order to reach the children at the youngest possible age, contacts with teachers may be extended to the nursery schools and kindergartens, where these are present.

THE ROLE OF THE LOCAL LEADERS

Another target group will consist of official leaders and opinion leaders, who can reach a part of the community through their words and examples. Sandhu et al. (1977) doubt, however, whether they can be used for demonstrational roles, since they found no differences in the adoption of public health measures by leaders and non-leaders. They emphasize their role in enlisting people's cooperation within health education programmes instead.

Even where innovators (who are usually too progressive to function as real leaders¹⁾) can be identified, and where leaders

¹⁾ Rogers and Shoemaker (1971) suggested that in traditional systems followers interact with opinion leaders who are at the same or even a lower level of competence, whereas in modern systems opinion leaders are sought who are more technically competent than their followers. More research in this field is, however, necessary.

are among the early adopters, the diffusion process of public health innovations and innovative behaviour may be too slow and limited in scope. When such leaders are approached exclusively, e.g. in the hope that latrines built in their homes will serve as a status symbol or as an example for many followers only a small proportion of the population may be reached. As a target group they remain important, however, since their cooperation, or at least absence of opposition, is required for the programme. They can also make statements which hold authority for their groups and demonstrate sanitary behaviour such as handwashing in a publicly visible way, e.g. through the installation of a tripod and bowl in front of the house or office. For the widest diffusion, opinion leaders of as many village categories as possible should be identified.

2. THE MASS MEDIA

Lack of the right type of knowledge is one of the barriers to the adoption of preventive health innovations and practices. Mass media (audio and audiovisual media such as radio, television, film and slide shows, flannel board presentations, and printed media such as newspapers, magazines, posters, bulletin boards, and handbills), are very suitable for the diffusion of knowledge on a larger scale, for they can reach many people in a short time at relatively low costs. Radio, especially, seemed an ideal medium for reaching illiterate audiences. For a while mass media were considered to be the answer to the problem of disseminating agricultural, health and family planning knowledge in developing countries.

The usefulness of the major mass media has, however, been over-rated. They may contribute to a widening "knowledge gap" between high and low socio-economic status groups (Tichenor et al., 1970)

because the latter will have less access to newspapers and radio than the former, and understand less of their messages. Shingi and Mody (1976) carried out a field experiment on television forum programmes and the agricultural ignorance of Indian farmers. One of their findings was that the average farmer did not know the meaning of 58 per cent of the technical terms used in selected programmes, words like hectare, kilogram, October and per cent. Similar findings have been reported by the All India Field Workshop on action research in agricultural information transfer when testing, among other things, posters and radio talks on rat control (Varma et al., 1973). Different styles of pictures (photos with and without background, shaded drawings, line drawings, silhouette and stylized drawings) may have a different effectiveness in conveying ideas to illiterate people (Fuglesang, 1973; NDS/UNICEF, 1975).

The effectiveness of the mass media is not only affected by the socio-economic level of the target groups. It is also necessary to find the right medium for each target group and each message. Radio, for example, was found to be more suitable for reaching women at home with general health information. Audiovisual media, such as film and slide demonstrations, were superior in reaching the outgoing males, and in passing on more specific information (Spector et al., 1971).

The use of local and traditional media, such as the street announcer, locally produced printed matter (e.g. local photographs, Ademuwagun, 1975; Courtejoie and Herman, 1966; local stories and poems, Cardenas, 1978; Celestin, 1977; Gumpertz, 1964; Patnaik, 1961), lectures, exhibitions, microscope demonstration, singing, dance and drama performances and puppet shows, may have the advantage of a greater accessibility, a better cultural fit and a higher credibility, in addition to offering entertainment, attracting more people, and affording

better possibilities for incorporating local circumstances and participation.

However, the medium may come in the way of the message and additional information may be needed, while for the purpose of persuasion the personal element is essential.

3. INTERPERSONAL CONTACTS

Interpersonal contacts have a greater impact than mass media in persuading people to adopt and continue an innovation or innovative behaviour.

SMALL GROUP MEETINGS

This is one of the reasons why many radio and television campaigns have been extended with forums, small groups which under the leadership of a chairman listen to the programmes together, and afterwards discuss the contents with the help of further information material distributed by the leader, who also reports back to the programme staff (Hall, 1973; Jain, 1969a, 1969b; Klonglan, 1967; Neurath, 1962; Shindy and Mody, 1967; UNESCO, 1964/65). In 1973, such a radio forum campaign, reaching about 2 million people, was organized in Tanzania on health knowledge and preventive health measures to be taken by groups and individuals, including sanitation. The activities of 2.131 groups were evaluated by programme supervisors immediately after the programme. Among these activities were the construction, repair and rebuilding of latrines (20 per cent) and the digging of wells (3 per cent) (Hall and Dodds, 1974; Hall, 1978).

Thus this group approach provided the personal element in the communication process. During the discussion the radio information could be explained by the group leaders and other group members, relating it to their every-day lives, and group decisions on joint or individual actions were facilitated.

Kidd and Byram (1978) used discussion groups after local drama performances on area problems such as venereal disease and sex education, nutrition and vegetable gardening, and village sanitation, but in addition tried to find organizational structures for a continued follow-up, e.g. through the publication of booklets for use by primary schools in reading lessons and by the regional extension services. Similar links with the regular school curriculum were made in schistosomiasis control programmes in Surinam and St. Lucia (Locketz, 1976; Celestin, 1977) and in a rural water supply programme in Paraguay (Cardenas, 1978).

Discussions can embrace many activities organized at village level for other purposes, such as testing a design, or information collection about the village. Visits to demonstration sites, field laboratory tests, with the use of microscopes, the recording of health practices, etc., can be used for educational purposes at the same time.

Such group meetings may vary greatly in their degree of formality. They may include talks given by an outside expert or by a trained person from the village itself, by whom facts are explained and knowledge is disseminated. Although the talks can be interrupted with frequent questions from the audience about obscurities, the atmosphere is that of the conventional teacher-student relationship. This system may work for a limited category of people i.e. those who have already got some knowledge and who rely on the authority of the speaker in his discourse.

The discussions may also be characterized by a guided approach, as described by Holmes (1964), who led his audience from the question "Do you have feet" to the conclusion that it would not

be a good idea to eat excreta¹⁾, and that food hygiene was necessary.

A larger degree of freedom is possible in discussions by small groups of people. Such groups may be neighbourhood gatherings of about 15 people or 3 to 6 contiguous households with all their members (White, 1978). In such groups the participants reach their own conclusions. They may need guidance to prevent too great a deviation from the subject, and a guaranteed chance for all to be heard in the discussion. Some training in group discussion techniques for the leaders of such groups will of course be necessary.

In Durban, South Africa, Steuart et al. (1962) used such free discussions in small friendship groups consisting of 2 to 7 women in an experiment on sanitation education and evaluation. A before-after survey on environmental sanitation conditions was held in the control area, which received the standard educational approach (individual interviews, community organization and mass media campaign) and in the study area, in which also 192 primary group meetings were held. Only in the area where small group meetings had been held, was the result a significant improvement in all six environmental sanitation items.

Such meetings may lead to authoritative statements by respected village leaders and group leaders in larger village gatherings. Public commitments can take the form of group or individual decisions, which may, however, need a follow-up.

¹⁾ The next questions concerned the stepping into the excreta of one's cow, some of which was brought into the house. Flies settle on human excreta and transfer some of it to food in the house. A similar discussion approach for the adoption of latrines has been demonstrated by Tentori (1962).

HOME VISITS

Finally, house visits and personal dialogues may be organized to encourage the adoption of behavioural changes, and to discuss barriers to this adoption.

Ogionwo (1973) compared this individual approach with the use of group meetings of varying size (of extended families, community associations and the whole village) at which public decisions were taken. He found that initial adoption rates for cholera vaccination and sanitation behaviour were higher for the village in which the latter methods were used, and that the continued adoption rates for health practices only showed an even greater difference.

EXTENSION AND INEQUITY

When extension workers, or official change agents, are used in this personal health education approach, care should be taken to avoid inequity effects. The approach of such workers has recently been subjected to a lot of criticism, especially in the field of agriculture, since it tends to widen the gap between high and low socio-economic groups in the community (IAC, 1975; Lele, 1975, Røling et al., 1976; Rogers, 1975, 1976; Saint and Coward, 1977; Wilson, 1977).

It has already been mentioned that the adoption of preventive health measures is often positively related to the standard of living, education, caste, social class, mass media, extension worker contacts and outside village contacts (Chandra, 1964; Chen, 1969; Ogionwo, 1973; Roberts, 1961; Rogers et al., 1970; Roy, 1968; Thorat, 1969; Tiglao, 1963).

The extension workers often concentrate on those categories of people to whom change comes easily, the so-called innovators and early adopters. Their personality, communication and socio-economic characteristics (such as a high level of literacy/education, a high number of outside contacts and high aspirations), make it easier for them to contact the change agent,

and vice versa, in order to learn about and discuss innovations. Effective communication between extension worker and client is facilitated by the relatively smaller social distance separating them, and the greater similarity in outlook and values.

In order to lower this inequity effect, more attention is now paid to the identification of potential late adopters, the design of special programmes for them, the involvement of people from this group as voluntary extension workers, and the recruitment of staff at the village level. An example of this last approach are the primary health workers. Their social level, compared with that of other members of the village, is sufficiently increased by training and an official function to give them some authority in matters of health, but not so much that a new gap is created between them and the other villagers.

The identification of late adopters and the development of special methods to stimulate them is also getting more attention.

A health education research project among American minority groups, for example, used projective techniques to measure nutrition attitudes of the respondents, so as to identify different target groups needing a different communication approach (Quesada et al., 1975).

Arango (1973) mentioned an out-of-reach programme of the dental school at Barú, Brazil, which identified non-innovative dentists in small towns in São Paulo province through tracing the diffusion of recent innovations. A pre-packaged course of slides and other educational material was then designed to introduce important dental innovations.

With these aids extension workers - who were dentists themselves - visited their conservative colleagues to demonstrate

the new techniques, and to assist in using them in practice.

Kar (1969) used the scores given by local administrators and public health workers to villages on cooperativeness in health and development programmes, and the records on their proportion of traditional groups in order to select villages that were slow adopters of preventive health measures.

Within these villages he combined a mass media approach with door-to-door visits, involving volunteers to persuade the villagers to be vaccinated against smallpox. Those who were found resistant were paid special home visits so that their objections could be identified. The first of these strong resisters who were persuaded, were then involved to reach the others.

Through the use of these additional voluntary extension workers a 90 per cent adoption of smallpox vaccination was reached instead of the 30 per cent of previous campaigns.

4. EDUCATION AIDS

Audiovisual aids usually form an important part of health education programmes, but their usefulness is limited, and they may even have certain negative effects (Scotney, 1976b): they are more suitable for the transfer of knowledge than for inducing changes in behaviour; they are passive; not always comprehensible (this requires pre-testing: Courtejoie and Herman, 1966; Fuglesang, 1973; Holmes, 1964; NDS/UNICEF, 1975); they tend to generalize; they are associated with entertainment; they are restricted in terms of time, place and scope; their credibility varies strongly; and their user may develop too great a dependence on them.

However, the advantages are considerable as well. They can be used to acquire or recapture the attention of the public and create a general awareness of a problem. They can reach many

people in a relatively short time, and bring variation in a longer campaign to both health educators and audience. They can illustrate points which are difficult or time consuming to put into words. Their message can trigger off group discussions, and reinforce earlier messages. Finally, the authority and prestige of the health educator can be strengthened by the use of attractive aids.

It may be useful to distinguish between general educational aids, like films and centrally produced posters, brochures and games (Holmes, 1964; Ehlan, 1978), and specific aids, which allow the involvement of the community in their design, production and distribution, and which reflect local situations. Such local aids should not, of course, cause problems of time, qualified manpower, organization and money for their production and distribution.

One can, for example, think of the production of local aids through art competitions as part of a school sanitation education programme. Such efforts could be concentrated on the specific environmental sanitation conditions in the village and their related diseases, and could result in village exhibitions. Such a competition was organized as a follow-up to a regional videotape programme on schistosomiasis in Surinam (Locketz, 1976).

Another function audiovisual aids can have is the distribution of information useful for the implementation of the programme. Various aids can be used to inform the villagers of times and places of meetings, to act as an information resumé to the community, to demonstrate the results of environmental sanitation and health surveys, to announce the joint decisions taken in the planning stage of the programme, and to give any special information for the realization of material improvements, e.g. guidelines for the construction of latrines, meat safes and water storage containers.

Even when village resources are involved in the development and production of such material for information and motivation, it should remain what it is called: an aid to the programme. Its use should not be detrimental to other educational methods (WHO/IRC, 1978).



Continued sanitation education is to lead to better sanitary practices like the regular washing of children. (photo: M. de Vreede)

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VII PLANNING FOR CONTINUITY

Even more important than the adoption of the environmental sanitation facilities is their continued functioning, and the internalization of proper sanitary behaviour. Community organization, regular evaluation and permanent links with the agencies will be the major tools to realize these objectives, as will be discussed in this and the following chapters.

1. OPERATIONAL MAINTENANCE

Prior to the official inauguration ceremony, arrangements for caretaking, operation, maintenance, repair and administration will have been made, including the supervision of these tasks.

Where there is a water agency maintenance team to look after the water supply, local caretakers may only be responsible for operation, or they may exercise a guarding task as well, and carry out non-technical maintenance, such as repairing fences, clearing blocked drains, providing protection against night-frosts, checking the covering of the pipes, etc., and recognizing and reporting problems at an early stage.

In some instances (Scotney, 1976; Pineo, 1976b, 1977) a nearby household watches over the proper use and functioning of the supply. In one Lesotho mountain village, the pipeline was divided into sections and the tasks of covering exposed pipes, and protecting them against frost and damage were given to the families living near these sections (Feachem et al., 1978).

Trouble or breakdowns will usually be reported through the village water organization, but in the case of a great number of smaller systems, e.g. wells with handpumps, there may be a

steady stream of complaints. Raman (1962) described how complaint boxes were kept at shops, schools, union board offices, health centres and subcentres. The residents and union board members were given printed complaint cards on which details of the location of the wells and the nature of the defect could be filled in. The cards were collected by the mobile technician on his regular repair rounds.

An alternative, finding increasing acceptance, is the training of local inhabitants for operation, maintenance and carrying out simple repairs. Such operators can be selected by the agency with, or without, suggestions from the village water organization or other village representatives, or can be elected by the community.

In some situations, e.g. where extensive labour migration of men occurs, or where women groups have been the major force behind the village water supply, one should consider training women as operators (Feachem et al., 1978; Pacey, 1977; White, 1978). The technology should then be adapted for women. Women's associations may also be involved in the selection procedure. Other prospective operators could be the primary health workers (Feachem et al., 1978; White, 1978), water haulers in danger of losing their jobs (White, 1978), traditional well diggers (Hima, 1976), people with some technical experience, e.g. fitters and surveyors (Buckles et al., 1978; Pacey, 1977), and village leader (Frankel and Yoomer, 1973). In Guatemala, the functions of operator, (para)engineer and promotor are even combined in the person of the rural water technician (Buckles et al., 1978).

It may be advisable to train more than one operator, so that housemoving or prolonged absence (e.g. for funerals) does not

lead to complications (Ketcham, 1970¹⁾, Matango and Mayerle, 1971). Kreysler (1970) also pointed at the importance of preventing any monopoly.

Operators could be paid by the agency directly or by the community from the water rates. In the latter case they may also be made responsible to the community, as is the case with some health personnel (Allan, 1975; Tomic et al., 1977). Non-financial, or indirect financial rewards, can also be given, such as exemption from communal labour (Matango and Mayerle, 1971), a free agricultural or housing plot, or materials and equipment for starting a small village workshop (Matango and Mayerle, 1971; Whyte, 1976). Where it is decided to combine the two functions of primary health worker and operator, the community may save one salary post, while at the same time the

1) This author described such a case in a well drilling programme in Madagascar. In visiting the various completed wells it was noted that one pumpman, trained under the project, was not on duty. When an old gentleman, who was getting ready to start the system, was asked where the man was, he replied that the man had joined the army three months previously but that they were not to worry for he had taught him everything. Whereupon the old man removed his coat and donned a suit of overalls which were hanging in the pumphouse. Then, with a flourish, he dusted the top of the fuel tank with an old rag and filled the reservoir. While he was struggling to get the stubborn engine started, the Malagasy mechanic asked him if he ever bothered to check the oil level. He replied that he looked at it every week or so. Then, with a great show of thoroughness, he removed the fuel sediment bowl, stirred the fluid vigorously with his index finger and then, when he had all the dirt particles in suspension, he deftly removed the petrol tank lid and dumped the contents of the bowl into it. A considerable amount of time was then spent on explaining to the old man the rudiments of proper engine care, but in view of the difference in age and background between the mechanic and the operator it is doubtful whether the explanation made any difference, for his one comment after the briefing by the mechanic was "Rubbish".

continuation of the sanitation education component of the programme is facilitated. White (1978) even suggested the construction of a community clinic near the water supply when this involved a central installation, such as a slow sand filter, whereby vigilance could be exercised by the village health worker (and the waiting patients) over the installation, e.g. to ensure that no damage is done, or that no pollution is caused by children and animals.

Responsibilities for the local operation and maintenance of water supplies and those for other environmental sanitation facilities could be combined. Instructions and supervision for building and upkeep even of private facilities, like latrines and composting pits, will stimulate maintenance and proper use. In some countries, public health inspectors carry out this task, but members of the community may also be officially involved, e.g. through the local health committee, water organization, or any other village institution with links with environmental and household sanitation.

Unfortunately, the construction of the facilities is a much more tangible matter than are operation and maintenance. Their importance is usually not realized until the moment that something goes wrong and the service can no longer be taken for granted. This is the main reason why Feachem et al. (1978) concluded that regular voluntary contributions towards maintenance will not work.

To keep people alert to the importance of proper operation and maintenance, as well as of environmental sanitation generally, it may be worthwhile to institute a yearly ceremony or campaign, such as the spring cleaning campaigns in China (Orleans and Suttmeier, 1970) or the town cleaning campaign in Singapore. Regular self surveys e.g. latrine surveys by local students and local or national competitions (household committee, or village of the year, Kincaid et al., n.d.) may also have a stimulating effect.

2. VILLAGE LEVEL ADMINISTRATION

There are many possible solutions when the agency or agencies responsible for rural water, sanitation and sanitation education decide to delegate some or most of the responsibilities for administration, operation, maintenance, and education at village level to one or more members of the community.

As mentioned before, one may decide on an overall system to be introduced during the preparatory phase, or it may be preferred to make individual arrangements, because a flexible approach to community level administration will offer better chances for an adaptation to the existing socio-cultural differences within the country or area. Such flexibility may vary from the joint decision on any form of community level administration to variations within one overall system. In Peru for example, in all communities an administrative committee is elected by a village meeting, organized with the assistance of the water agency's promotor, but the size of this committee is left to the particular community, provided it does not get too cumbersome to function properly (Republic of Peru, 1977).

LOCAL SPECIALISTS

In small communities, where delegated tasks are relatively simple, it may be advisable to make one person, preferably the village health worker, responsible for the organization of maintenance, administration, sanitation education and communication with the agencies, or to set up a team consisting of an operator and health worker for these tasks.

Ad hoc arrangements could also be made with the help of existing village institutions, such as traditional organizations for

water supply or similar communal facilities. These organizations will have been contacted during the preparatory phase, when information was collected about the community. Two other types were studied in the Lesotho field study, these were the utilization of the traditional chieftainship and the involvement of various existing village committees (Feachem et al., 1978).

White (1978) pointed out that, in a changing society, it will be necessary to find out if and to what extent the authority of the traditional leaders is still recognized. The various stages in transitory situations are well illustrated by the six case studies in the above mentioned Lesotho field study of rural water supplies. In four of the villages, chiefs were involved in the organization of village level management, but it was successful in only one case where the chief, an exceptionally well-educated and capable man, initiated the programme himself and organized an elected committee chaired by his charismatic wife. In the other cases committees were also formed, but the chiefs were an impediment because of their frequent absence, the organization of opposing committees, and the people's reluctance to commit themselves to either the old or the new order (Feachem et al., 1978).

Use can also be made of existing village committees, such as a general development committee. In Lesotho, these committees were mostly selected through the one-party system, but the degree of government control under which they functioned varied greatly, while in a number of villages they were, for one reason or another, freely elected (Feachem et al., 1978).

Besides selected, or elected, general development committees there may be existing committees in specific fields, such as on garden development and health, to which water supply and sanitation can be added as an additional task. Isely and Martin

(1977) describe the organization of such health committees in Cameroon. Their activities resulted in the construction of latrines, animal enclosures, garbage pits, and the protection of springs. The use of such village health committees, combining environmental sanitation with other activities, like immunization or nutrition programmes, may not be feasible in larger communities and in more complex environmental sanitation systems, where more administration and maintenance is demanded.

NEW VILLAGE INSTITUTIONS

Where these committees do not exist, do not function properly, or where a separate water and sanitation committee seems advisable, new committees may be formed, such as the local water boards in many Latin American countries (Donaldson, 1976). In Peru such administrative committees are chosen by a general assembly organized by the promoters of the water supply agency, and are responsible for the self-help activities, operation, maintenance and administration of the system (Republic of Peru, 1977). In Colombia however, these responsibilities are phased out and split up, as will be discussed later.

Cairncross et al. (1977) and Feachem et al. (1978) pointed out that in their experiences, democratically chosen committees functioned best. The negative influence of direction from above was experienced in a well digging project in Haiti. Since the formation of village committees had become compulsory, political issues had made many of them ineffectual (World Bank, 1978). Feachem et al. (1978) also advocated single purpose committees rather than general development committees, or committees combining a number of related programmes such as those for village garden and water development. An example of the successful functioning of such single purpose committees is a rural area development project in Yugoslavia. Here, special Health Committees were created for each programme component, such as a water supply

system, local health stations and school gardens (Nikolic et al., 1975; Tomic et al., 1977). Hima (1976), on the other hand, advocated the integration of well building activities with the tasks of production and marketing cooperativeness.

USER ASSOCIATIONS

Another solution for village level organization is the formation of "user-associations" or "user-groups" (Feachem et al., 1978; Scotney, 1976; Vierstra, 1977), which provide water only to members. Although initial funding would largely devolve on the government, or other outside financing agencies, the matter of recurrent costs could be solved by regular cash contributions from members who had made a personal choice to join the association. They may therefore be considered to be better motivated, while sanctions can be applied to ensure regular payment.

A properly functioning association may also reduce factionalism and conflict, because individuals rather than the whole village are involved, and power and influence are more evenly spread (Feachem et al., 1978). This might make it easier to prevent secondary use being made of the facilities, such as the irrigation or cattle watering common in a system of flat rates, which furthers the inequity between farmers and people with no agricultural plot or stock at all (Vierstra, 1977).

However, user associations may themselves increase inequities by making it more difficult for the poorer members of a community to join when equal contributions are asked from all (White, 1978).

Control of water use by non-members may be difficult, especially with standpipes. In a scheme in Kenya a family who knew all members personally held the key to the supply, but even then supply to third parties could not be prevented (Scotney, 1976). Another problem with some users' groups in Kenya was that they were not real groups, just lists of names without identity or leadership. Only the groups which had developed an inner cohesion were still functioning (Scotney, 1976).

A COMBINED APPROACH

A combination of a village committee and users' association approach is found in Colombia where, after discussions, the local authorities, members of the village development committee and local leaders form communal action committees for the construction phase, with the assistance of the central promotion division of the water agency.

The subsequent administration and maintenance of the supply are carried out by an autonomous administrative committee. This committee is composed of one representative each of the community action committee and the users' association, both elected by a general assembly of users, and the promotor as the agency representative (Ramirez and Orozco, 1976; Republic of Colombia, n.d.; Santacruz, pers.comm.).

A similar approach is followed in Paraguay, where an organizational committee is elected by a general assembly of community leaders, representatives of village organizations and heads of families for the implementation of the first phase of the construction programme (source improvement). Upon completion, a final organization, the Water Board, is established in accordance with the law (Cardenas, 1978).

Such a solution is also advised by Feachem et al. (1978). They suggested that, in Lesotho, the whole village should elect the village water committee that is to organize the building of an

improved supply. After that the system should be used by subscribers only, who would also choose the committee for the administration of the supply from their midst.

SUB CONTRACTORS

Sometimes, water supply systems are leased to individuals. In Kenya and Tanzania for example, kiosks and licensed retailers are found (Carruthers, 1973; Scotney, 1976).

Such solutions are likely to create an easy distribution and rate collection system, facilitate the operation and maintenance and control damage and pollution. Special precautions will be necessary, however, to avoid that the poorest people spend a substantial part of their income on drinking water. Figures for Yemen and East African cities showed that up to 10 per cent of the income of the average worker is used for buying water (Davelaar, 1978; White et al., 1972).

A solution, suggested by the World Bank, is that the agency is on the alert to the making of excessive profits. In such a case it should raise its price to the subcontractors and return the extra revenue to the general village funds (World Bank, 1975). Another suggestion, made by Scotney (1976), is that kiosks be leased to local cooperative groups. Considering the negative consequences this service may have for any income redistribution objectives of the scheme, consultation with its future users may be deemed a necessity.

PRIVATE OWNERSHIP

Private ownership may occur where large institutions, such as missions or schools, share a water supply with the community, or when storekeepers also act as water vendors from a private source. The state of maintenance is usually better than that of public supplies (Feachem et al., 1978; OECD, 1978), but where payment is demanded, costs for users may be relatively high.

A private supply using rainwater from corrugated iron roofs depends greatly on the regularity of rainfall. Feachem et al. (1978) found that in Lesotho the number of lowland houses with such roofs was quite high, but the proportion with some kind of guttering very low. In one village, 63 per cent of the houses had iron instead of thatched roofs, but only three had crude guttering provisions. When asked for the reasons, householders replied that they could not afford guttering, although the cost of a traditional house would be about 1/7th of that of the roofing alone. A more logical explanation is, that the distribution of rainfall over the year necessitates storage. A storage tank, of a size sufficient for half of the daily water consumption, costs about twice as much as a roof. Part of the water would still need to be collected from another source, despite the large investment.

Subsidies on catchment tanks and guttering could improve this, but would mean further advantages for those who can already afford a more expensive type of house. In some places (e.g. in Central Kenya, pers.obs.) women self-help groups exist, working as temporary agricultural labourers during the harvesting season, until the group has earned enough cash to afford iron roofs for each member's house, and the provision of subsidies for guttering and catchment tanks, via such groups, might be considered.

PUBLIC OWNERSHIP

Finally, the system may be fully owned by the community, as in Ujamaa villages in Tanzania, or it may be owned by a local authority, provided there is sufficient legalized decentralization (Feachem et al., 1978). In 1962 a special law in Nepal authorized elected village councils to initiate and execute all kinds of self-help programmes including water supplies and excreta disposal, using 10 per cent of the local taxes for the

purpose (Blackwell, 1969). In Brazil, mixed companies of public officials and representatives of the commercial section are found (McGarry, 1977).

INTEGRATED ADMINISTRATION

These arrangements, however, still leave open the question of sanitation education. The importance of integrated environmental sanitation programmes in which safe water supplies, excreta disposal facilities and sanitation education are the minimal components, is increasingly recognized. However, package approaches covering community organization and education through local participation in the planning, implementation and continuation phases are still rare. Literature on national or relatively large scale programmes, in which all these aspects are covered at the various levels of the agencies involved, is equally scarce.

Continued community participation in long-term sanitation education programmes will be necessary. Community organization and development techniques should be part of the educational programme, so that the members of the community will participate in planning programmes, learn how to reinforce behaviour changes and provide their own self-help during the maintenance phase following the actual programme (Loring, 1977). A health committee may be formed, or may already exist, or a subcommittee of the watercommittee may be responsible for the continued sanitation education activities and the control of public sanitary conditions and behaviour. It can provide assistance, advice and supervision for the improvement of sanitation facilities in the home. Ademuwagun (1975) for example, reported how the comfort station (communal sanitation and washing facility) with the best results was the one, where a retired public works officer informally continued the sanitation education programme, after it had officially ended.

Primary health workers may be involved, and in some cases they may be the operators, but usually their task will be a supporting one. Formal arrangements for long term community involvement may make the task of official supervisors, like public health inspectors, a stimulating rather than a corrective one.

Such arrangements will also facilitate long-term evaluation with the involvement of the community. The short-term impacts of a sanitation education programme as part of a larger water supply and sanitation programme may be great because of the heightened interest in these matters, but interest may wane with the passage of time. In other cases not everyone will, or can, realize all the improvements propagated within the relatively short time of an action programme and the village population and housing pattern may change continuously. Regular evaluation of environmental sanitation conditions, and revival of educational efforts through village level institutions, may therefore be a useful addition to the programme of the regular health staff.

3. DELEGATION OF AUTHORITY

When some responsibilities for operation, maintenance, administration and sanitation education are delegated to village institutions or members of the community, these need be given some authority in order to function properly. They will need the authority to enforce the public regulations on sanitary behaviour and provisions on which the community decided at the beginning of the programme, while more informal sanctions can be kept for those activities which do not cause public nuisance or risks. They will also need some authority to ensure the continued contribution of the community to the operation, maintenance and administration of the system. Although sometimes

assistance in labour or local materials may be demanded, these contributions will usually be in the form of water rates.

In many Latin American countries, the rates must also cover the repayment of the loan given to the community for the construction of the system. This loan often originates from revolving funds for water supplies on a regional, or national basis (Donaldson, 1976). The proportion of the total costs and the length of time given for repayment may vary with local circumstances, such as size of the community or potential income (World Bank, 1976). Since it is important that the rates should be accepted as equitable, they should be fixed in concert with the users²⁾. With metered house connections, this will be much easier than with standposts or unmetered individual or group connections.

In this matter, consultation with the village water organization on the apportioning of the charges may be useful, since the organization has an inside knowledge of community conditions of which the agency got no more than an impression during the information collection stage.

Final supervision of rate collection may rest with the agency representative through whom the link with higher levels is maintained (see chapter IX). This arrangement may also prevent misuse of authority. When council boreholes in Botswana, where charges were on a pro rata basis for numbers of stock watered, were handed over to local syndicate management, a flat rate for each stockowner was substituted regardless of the number

²⁾ In Korea, specific village rates are set by the maintenance committee, covering operation, maintenance and depreciation (Pineo, 1976c).

of stock he watered. This problem was also encountered with committees administrating newly built dam reservoirs (Chambers and Belshaw, 1973).

Other matters in which the village administration may be given some authority are those concerning decisions on the time and place of collection. These factors may account for a poor payment record. Farmers for example, may be dependent on the harvesting and marketing season, which makes regular monthly payments much more difficult than payments linked to the times when they have ready cash, while monthly payments may be preferred by people with regular salaries (Jakobsen et al., 1971; (PRAI, 1968; Scotney, 1976). Payments at some distant office may also be a barrier to regularity (Scotney, 1976), and the inadequacy of a water point due to its remote situation or intermittent supply may be a reason for a rate reduction (WHO/IRC, 1978).

As with the contributions during the construction phase, sanctions which are less negative than the cutting-off of the supply of non-payers may be considered.

In the Dominican Republic, a practice of personal visits to non-payers seeks to improve the situation where at the end of 1975 about one third of the total number of house connections had been suspended. This system is already functioning in Peru (Pineo, 1976b, 1976c).



Evaluation may vary from qualitative process evaluation to quantitative impact evaluation. Regular water quality tests can be one of the methods used in the data collection. (photo: United Nations)

VIII EVALUATION AND COMMUNITY PARTICIPATION

Two types of evaluation will be necessary: process evaluation during the implementation stage to provide feedback information for any readjustment to the programme; and overall evaluation to see to what extent the project has succeeded in realizing its objectives. Through such evaluations conclusions can be drawn for the drafting of new programmes.

Process evaluation is an ongoing activity in which each step in the implementation of the programme is analyzed and discussed with the community. The staging of objectives and the development of time schedules may help to subdivide the programme into units which can be recognized and overseen by the community (Steuart, 1969). The timing and integration of process evaluation activities, while the programme is going on, may be difficult, as was the case with an evaluation study by village health promoters in Olancho, Honduras. The use of two aids, a step diagram, and a board calendar proved helpful (Feuerstein, 1978).

Simple record keeping techniques, e.g. on attendance, may also help, but should not take up too much time (White, 1978) or constitute too serious a threat to the people recorded (Feachem et al., 1978). They may also contribute to a better service to the community in the educational programme.

Belloncle (1974), for example, reported how through simple record keeping techniques health workers in Niger discovered that with their conventional approach they reached only 15 per cent of the population.

In Cameroon, the mobile agents responsible for setting up village health committees were given three criteria on which the proper functioning of these committees were to be evaluated:

attendance of meetings without reminder, initiation of new programmes, and detailed demands for outside help after an inventarization of village resources (Isely and Martin, 1977).

Reports on process evaluation by members of the community themselves are still rare. An example is provided by an environmental sanitation pilot project in Tonga, Polynesia, where observations of visible achievements by villagers and health staff were discussed in weekly meetings (Fanamanu and Vaipulu, 1966).

Understanding and flexibility will be demanded from both parties. When the construction work is judged to be poor by the technical agency personnel, e.g. because the trenches are not deep enough, or progress is too slow, an explanation of the consequences for the future functioning of the supply, or for future rates where community contributions are to be deduced from the initial charges, or where a loan is given, should precede any application of formal or informal sanctions. On the other hand, there may also be specific and valid reasons on the part of the villagers why their contributions do not come up to expectations, and an adjustment acceptable to the agency should be possible. Twumasi et al. (1977), reported that there was a reluctance to report breakdowns in improved water supplies in Ghana for fear of being considered disrespectful. In cultures with a strong patron-client relationship an upwards flow of communication will not come as a matter of course (Blackwell, 1969; Bryant, 1969).

In many cases information to the community has concerned matters required from its members rather than matters about which the community would like to learn or on which they would like to obtain guarantees from the agency. Scotney (1976), noticed that there was no information on the causes of breakdowns and the estimated time needed for repairs from an agency-maintained water supply. The reasons for time-lags of up to 16 months in

an Indian latrine building project were not explained by any higher officials. Explanations from the fieldworker were not accepted and angry villagers demanded their money back (PRAI, 1968).

The ongoing evaluative process at village level may result in the submission of regular reports to higher levels (Republic of Peru, 1977). Instantaneous evaluation field visits may take place with reports covering a cross-section of the activity at a given moment for a global analysis and evaluation of the experiences up to that moment (Ad Hoc Working Group on Rural Potable Water Supply and Sanitation, 1975). Provisions may also be made for regular evaluative visits by a programme supervisor or special evaluator (White, 1978). Whatever arrangements are made, involvement of community representatives in the evaluation meetings and communication of its results to the community as a whole is essential. It will provide a learning experience which may contribute to the long-term effects of the programme and to the success of subsequent development projects.

Overall evaluation by members of the community themselves is still rare. The Olancho project in Honduras mentioned above is an example. Here, housewives' clubs elected one of their members for training as a voluntary village health promotor. After five years, an evaluation of the programme was carried out by these promoters themselves with the assistance of an outside evaluation adviser (Feuerstein, 1978).

As with the initial data collection, not all evaluation is necessarily a highly technical, scientifically rigorous and quantitative study. McGarry (1977) quoted Tschannerl (1973) who condemned an evaluation in mere numerical terms: "so many boreholes drilled, so many projects designed, with no mention made of the process of how this was accomplished, or other

results aside from the structure. One never reads, for example, that the engineers have decided to spend more time with the peasants, so that they would get better acquainted with their problems, or that so many plumbers in the village were trained in the course of construction or that as a result of suggestions from the villagers a different, cheaper design for a particular item was adopted". When evaluation in a wider sense is accepted, it will also be easier to involve (part of) the population in it, with educational effects besides. Some aspects may well be measured through participant observation, questioning and studying of records by a number of villagers. If the evaluation is to be done in a systematic way, however, training and guidance will usually be necessary.

Overall evaluation may be on the short-term effects and long-term effects, on direct and indirect benefits, on immediate objectives and on factors of general well-being. In addition, a summing up may be given of the experiences gained during the implementation phase, especially of the obstacles encountered and the ways in which they were overcome.

The short-term immediate objectives are the proper construction, functioning and use of the facilities. This involves a more or less technical evaluation, but also concerns the satisfaction of the users and the absence of any problems connected with the use (e.g. ease of handling, absence of smell, insect and rat problems, cultural acceptability, safety, etc.); and the exclusive or at least regular use of the facilities. Other related aspects are an awareness of the importance of the facilities (Kivlin et al., 1968; PRAI, 1969) and the adoption of the appropriate attitude in using them, as well as a general improvement in personal and household hygiene. A third objective is the successful involvement of the community throughout the process.

Involvement of community representatives in the evaluation of these aspects, and the sharing of the conclusions with all its members, will be a logical consequence of the approach chosen. It will stress the responsibilities which the community has for the outcome of longer term evaluations.

Objectives on a longer term in which the community will be directly involved are the continued use, maintenance and administration of the facilities. These include a satisfactory financing system, and the development of appropriate habits and norms in the use of the facilities and in sanitary behaviour in general. Regular reports by the village institutions responsible for these factors, and visits by a supervisor or an evaluator (with both parties communicating their conclusions to the general community where necessary) may form the basis for such an evaluation.

Measuring of direct and indirect benefits will necessitate

of a water supply, like a reduction in collection time and effort (Curtis, 1977 the improvement of water quality at the collection point and at other points between collection and consumption (Feachem, 1977a; Feachem et al., 1978), and increased water quantity and availability.

Indirect benefits of environmental sanitation programmes may be a reduction in water-related diseases and its economic value in terms of health costs (White et al., 1972) or nutrition costs (Sombhong Kutranon, pers.comm.), the time and energy gained, the use of the greater water quantity, availability and reliability as well as waste disposal products for productive purposes and the use of energy and time gains for productive and social purposes (Curtis, 1977a; Feachem et al., 1978; Fenwick, n.d.; Jakobsen et al., 1971; Warner, 1975). An improvement of housing conditions may also be a result (Fenwick, n.d.).

Such impact studies will necessitate the collection of quantitative data before and after the programme, with or without control groups¹⁾, and measuring short- and long-term impacts through further follow up studies. Involvement of the community in such quantitative studies may be less feasible, but knowledge about their purpose and sharing of the results will be necessary.

Finally, there may be long-term effects on social well being and government policies, as discussed in chapter I. A greater self-reliance and cooperativeness can be achieved, better village organization, a better deal for the poor including income redistribution effects on rural and urban fringe areas and within rural communities, a decrease in urbanization and an increase in concentrated settlement, the emancipation of women, increased loyalty towards political parties or political leaders responsible for water supply policies, and a generally improved standard of rural living (health, leisure, nutrition, income, housing, social and cultural diversification). The measurement of such effects and the determination of causal links will be difficult, however, while short- and long-term negative impacts may also occur, like increased village unemployment and a more inequitable land distribution (Jakobsen et al., 1971), weakened

1) It may be interesting to compare the perceived and actual health impacts on communities where a health education component was integrated in the water supply and sanitation programme, with those where no such component was included. Whiting and Krystall (n.d.), for example, found that the health benefits quoted in four case studies on the introduction of an improved water supply in Kenya, without a specific sanitation education component, was relatively low; and through more rigorous studies in Lesotho Feachem et al. (1978) found that actual health impacts were nil.

political loyalty and village initiative (Feachem et al., 1978) and a heavier workload for housewives, e.g. in Kenya (Whiting and Krystall, n.d.), and in Guatemala (World Bank, 1978).



Student sanitarians check and repair a well near the Kolladuba Health Centre in Ethiopia. (photo: WHO)



An essential part of the higher level support is the regular training of villagers for technical, educational and administrative tasks. (photo: IRC)

XI HIGHER LEVEL SUPPORT

1. ORGANIZATIONAL STRUCTURE

The acceptance of an integrated approach towards rural water supply and sanitation, in which community participation and education are essential, will have consequences for the organizational structure behind the programmes.

In most countries a national water supply unit will already exist. See, for instance, the report on well construction in three countries in francophone Africa (BURGEAP, 1974). The existence of special rural programmes, as described for eight developing countries by Pineo (1976), may be less universal.

These reports showed that excreta disposal programmes were less common, and usually not integrated into a rural water supply programme. This may be because water supply programmes concern public provisions or systems, while excreta disposal programmes in rural areas will usually be limited to construction without a sewage system. Therefore, waste disposal usually is a subject of a health education programme, whereas health education as part of a public water supply programme is less usual.

Where community participation in the construction of rural water supplies is accepted as an essential part of the programme, special units for community organization and motivation often exist within the rural water organization. Little, however, is known on their role in sanitation education, how they try to effect an optimal health impact of the water supply itself, and an improvement of environmental health in general

through activities for better waste disposal and personal and household hygiene.

Another consequence of the acceptance of community participation will be its effect on the functioning of the other divisions within the agency, such as the planning department and the departments for the construction, operation, maintenance and management of water supplies. In the latter departments, for example, more supervision and a different approach will be needed, as will be the case for the supply line (Donaldson, 1976; Pineo, 1973; PRAI, 1968). The timely delivery of construction materials and spare parts will be even more important when the community has been involved in and contributing to the programme from the beginning. When the agency fails to answer the expectations of the community, without an acceptable explanation for this failure (and any explanation will become unacceptable when it has been repeated too often), one cannot blame the community for lapsing as well.

An organizational unification of the entire integrated programme of environmental sanitation in its widest sense would of course be ideal, but it will usually be impossible to realize it within the existing government structure. The formulation of a special policy on rural water supply and sanitation, including a definition of the concepts "integrated" and "community participation", will usually result in a series of organigrams, networks of administrative coordination and lines of communication, and a division of responsibilities.

2. ADMINISTRATION, COORDINATION AND LINES OF RESPONSIBILITY

LINKS BETWEEN THE ORGANIZATIONS

In some cases 10 or more separate agencies are involved in supplying water within one country (McGarry, 1977), and coordination of their activities is seldom optimal.

Such coordination of activities will nevertheless be essential for an integrated rural water supply and sanitation programme at the local level, since the motivation of the community and the initiation of community organization and education programmes must start before the initiation of the technological programme. The links with non-technical agencies and sections should be established long before the programme is actually started. The necessity of cooperation and coordination of the various activities should be understood and taken seriously by all parties¹⁾. With the integration of a single unit responsible for community organization, coordination may be easier than when more such organizations are involved, but some interagency contacts must be made in any case, e.g. for school health education and adult education with the department of education, or for rural composting with the department of agriculture. All this must be done as early as possible.

¹⁾ In practice, the integration of technical and community development components and the necessary decentralization and two-way communication may not be easily accepted. Feachem et al. (1978) documented several examples in which the district community development officer was circumvented, ignored or not actively involved by the water agency.

The importance of early contacts between the political sector and the bureaucracy, between planners and policy makers, has already been mentioned in chapter I. These contacts should result in explicit guidelines for macro planning. Other categories for linkage are planning, outside production and research units, planners and consultants, and the various financing agencies and departments (Dube, 1967).

The organization of institutionalized interagency contacts, such as general conferences, interagency meetings, the installation of coordinating committees and the use of information sheets (Hall, 1978; Miyasaka, 1971; PRAI, 1968; WHO/IRC, 1978) should be taken seriously by all, if it is to guarantee success (PRAI, 1968).

LINKS WITHIN THE ORGANIZATIONS

In practice, one or two agencies will have the major responsibility for the technical and non-technical components of the programme, and the horizontal and vertical links within the(se) organization(s) will be a second condition for a good higher level support.

Woods (1977) stressed the importance of a downward, upward and horizontal communication flow. When a message is trickling down, one should check whether it contains relevant information, whether it is understood and used, and whether it reaches the intended audience.

In the upward flow, which is more difficult to realize, distortion of a message often takes place since there is more appreciation of positive than of negative information. The latter may be more important, however, to adapt the programme in time for ultimate success. A critical factor for successful community participation and trust is the knowledge that the agency

welcomes information on problems, and is prepared to act on it. Horizontal flows of information are as essential, but hard to realize since such flows are often only informal.

A short training in the communication network of the programme, covering upward, horizontal and downward flow within and between the organizations involved may be very useful. Alternatively, one may think of the mere visualization of this network, with its various key persons serving as liaison officers in their respective fields. A timetable to coordinate the various activities should also be added. An explanation of these schemes can be given to those who lack experience in large scale planning, in particular the lower level officials and community representatives.

Decentralization of responsibilities should be fully accepted by the higher levels. With the creation of village level organization, appropriate organization at the local government level should also be instituted, especially for maintenance matters (WHO/IRC, 1978).

CONTINUED LIAISON WITH THE COMMUNITY

Manpower Since the continuity both in the functioning of the environmental sanitation facilities and in the sanitation behaviour of the members of the community is generally more important than the initial adoption, provisions will have to be made for continued supervision and assistance by the agency.

Where government officers are present, e.g. public health inspectors and community development workers, the continued use of the facilities, the maintenance of waste facilities such as latrines, refuse heaps and public rubbish dumps, and the general household hygiene can be checked by them. However, their effectiveness will often be limited by factors such as their frequent

transfer, the lack of clear responsibilities for the stimulation of a continued adoption, and the social distance between them and many of the villagers (PRAI, 1969). The health inspectors may see their task too much as the correction of unsatisfactory conditions and behaviour through penalties, and may interpret education to mean publicity and information only. Adaptation of selection criteria and training methods may be needed, as well as the diffusion of clear guidelines on a wider task and a new approach.

Primary health workers, who are usually tied more to their own community and take part in the community life may be more successful, but to guarantee the continuity of their work it may be necessary to develop the possibility of a village or area bound carrier. In any case, village committees should continue to play a role.

Where villagers are responsible for simple maintenance and repair, and also where agency stationed operators are working, there is an obvious need for higher level support to preventive maintenance and repair, and for the timely provision of spare parts, including the upkeep of a small local stock. It may be helpful, in facilitating such support, to provide for the existence of a special unit, operating within the agency responsible for the maintenance and repair of the technological facilities. In addition, the creation of the function of a special liaison officer could be considered. The local operator can contact this officer when other channels of contact are blocked, e.g. for the supply of spare parts. The presence of such a personal contact person within the agency might facilitate upward communication. Finally, Scotney (1976) suggested the publication of a regular bulletin for distribution to scattered field staff personnel, to improve downward communication.

For the continued liaison with administrative committees, various arrangements have been made in Latin America. Promoters who have been used for the organization and motivation of the community can also be made responsible for the supervision of administrative committees in an area, as is the case in Colombia. In this country, the promotor becomes an outside member of the administrative committee after the completion of the supply. In Peru the same task is carried out by health inspectors who visit the community every three to four months and review the accounts. Since circa 50 per cent of the users were found to be behind in their payments, an association of administrative committees has been planned to stimulate their proper functioning (Pineo, 1976c). In Korea specially trained sanitarians are used for the continued liaison with the communities. The training of the water committee and the operator, and the supervision of system maintenance and water quality, are part of their task, while the design of the simpler systems is also carried out by them (Pineo, 1976e).

Morfitt et al. (1969) suggested to make such sanitary inspectors responsible for the routine inspection of both administration and technology, including the control of equipment and water quality, assistance in the extension, repair and replacement of the system, and the organization of refresher courses within the sanitation programme of the health department.

In the Dominican Republic a special category of supervisors, called commercial agents, have been trained. These agents are responsible for about 15 systems scheduled on 4 routes, so that every system receives a monthly visit. During this visit the books are audited, accounts are checked with the treasurer of the committee, the money is forwarded to the zone office by post, and problems and matters of interest are discussed in a meeting with the administrative committee.

To improve rate payments, the agent accompanies the treasurer

or bill collector on housevisits to users who have fallen behind in the payment of their contributions. A report, with recommendations if necessary, is then sent to the zone office (Pineo, 1973, 1976a).

Listing and Recording The preparation of checklists and guidelines, and the standardization of records will also facilitate the continued contact between the agency and the community. Reference has already been made to the use of model constitution (Cairncross et al., 1977; Feachem et al., 1978), guidelines for water committees (Republic of Peru, n.d.), community and individual contracts (Republic of Colombia, n.d.; Republic of Peru, 1977; Patnaik, 1961; Pineo, 1976a, 1976c), village books (Whyte, 1976) and questionnaires for socio-economic surveys (Republic of Peru, 1977).

For the recording of operational activities Scotney (1976) suggested an occurrence book, in which observations of a technical and a non-technical nature are entered, to which rainfall records can be added. The use of standardized report forms for operators (BURGEAP, 1974); standardized request forms for agency assistance in maintenance and repair (Raman, 1962) and standardized equipment lists (Donaldson, 1976) should also be mentioned.

Lovell (1978) and Curtis (1977) developed checklists on higher level planning and support and on the allocation of responsibilities.

3. TRAINING

Various categories of people involved in rural water supply and sanitation programmes will need special training courses to optimize their functioning in such programmes. This is espe-

cially the case when the programmes are organized on a large scale, and training cannot be given informally at the village level.

The importance of an integrated programme, including community participation, sanitation education and upward, downward and horizontal communication, will have to be impressed on all personnel of the agencies involved, in particular on the engineering staff working in the field.

Local caretakers and operators will need some technical training. In the case of the former this may be limited to the early recognition of serious trouble, but for the latter it also involves the undertaking of simple repairs and technical maintenance. The need for vigilance over the supply, preventing damage by children, animals and clumsy or ignorant users, as well as wastage and pollution at the source should also be included. Added to this some basic knowledge of sanitation and sanitation education is required. The amount of instruction in the latter will depend on the actual task the operator or caretaker will have in the educational process. Knowledge of his responsibilities should include knowledge of his authority: an operator may for example be given the right to intervene when latrines are constructed too close to a source, in order to prevent all risks of groundwater pollution.

Where promoters are used, they will need training in community organization, community motivation and community analysis, including the possible involvement of the community in the process. Another major topic will be sanitation education, in cooperation with other health workers and organizations in the community. In addition, the training of administrative committees, or of any person responsible for the administration of the technological systems, could be carried out by them.

Alternatively, village administrators may be directly trained by the agency, who may organize "leaders' camps" or other short training courses for the various types of village leadership (Dube, 1967; PRAI, 1969). Such training might promote a spirit of cooperativeness among them, and lead to a division of responsibilities.

Training courses for fieldworkers and community members should be based on the conditions in which they have to work and the type of educational approach that will be expected from them at community level. Staged training may be necessary to train the large numbers of people involved in participatory programmes. Morfitt et al. (1969) suggested progressive training. This implies that construction workers are gradually trained for increasingly difficult tasks, resulting in a technical manpower pool for operation and maintenance. Similarly, progressive training is given to a community survey leader; who in turn trains the volunteer neighbourhood survey team, is further trained as a community information leader, and finally as a water systems director. Staged training of technologists (Pineo, 1976d; PRAI, 1968) and discussion leaders (Hall, 1974, 1978; Hall and Dodds, 1974) has been used successfully.

Scotney (1976) suggested that the analysis of successful operators' attitudes and personalities be taken as a basis for selection and training.

It should be remembered that most participants will have received their formal education along the traditional lines of a teacher-student relationship: one-way communication, reproduction of facts, and little flexibility. It may be quite difficult for these trainees to accept a different approach, to which they and the villagers may attach less prestige or authority.

It will be important to develop field guidelines, checklists and training manuals for the various categories of trainees, as aids in education and implementation. In Peru, for example, the promoters use a manual for their work in the community, starting with the reading up of the technical studies and ending with a number of suggestions which can be made to the administrative committee, to obtain additional financing for the payment of the community instalments towards the system loans (Republic of Peru, 1977).

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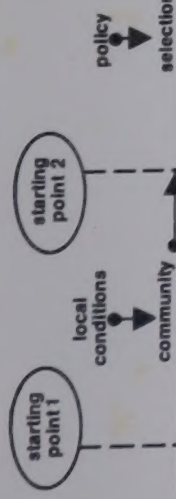
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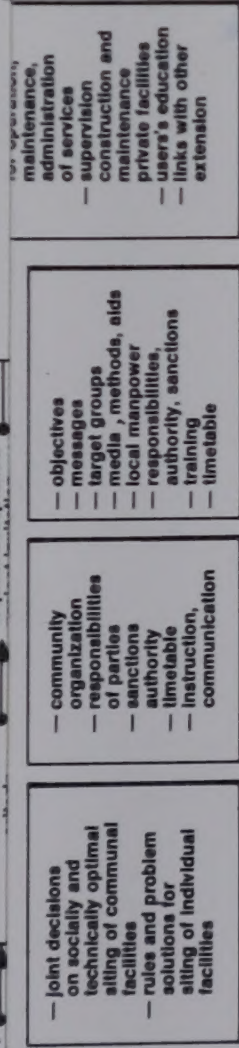
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A: INITIATION (chapter I)



- worst-first
- growth-point
- combination

- regional development committees
- politicians
- government services, etc.



D: IMPLEMENTATION (chapters V, VI, VII)

Implementation, resulting in:
ceremonial adoption of completed facilities and formal agreement on arrangements for continuity

- ownership
- division of responsibilities
- authority
- manpower arrangements

F: HIGHER LEVEL SUPPORT (chapters IV, IX)

F: EVALUATION (chapter VIII)



SOCIAL ASPECTS OF COMMUNITY WATER SUPPLY AND SANITATION PROGRAMMES: A FLOW DIAGRAM

